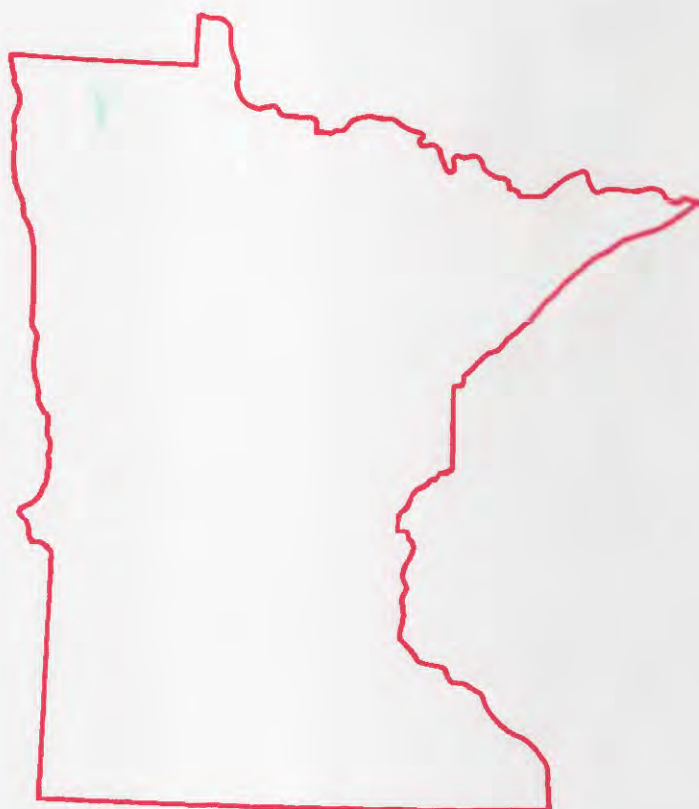


Water Resources Data Minnesota Water Year 1997



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT MN-97-1
Prepared in cooperation with the Minnesota Department of
Natural Resources, Division of Waters; the Minnesota
Department of Transportation; and with other State,
municipal, and Federal agencies



CALENDAR FOR WATER YEAR 1997

1996

OCTOBER							NOVEMBER							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
		1	2	3	4	5						1	2	1	2	3	4	5	6	7
6	7	8	9	10	11	12	3	4	5	6	7	8	9	8	9	10	11	12	13	14
13	14	15	16	17	18	19	10	11	12	13	14	15	16	15	16	17	18	19	20	21
20	21	22	23	24	25	26	17	18	19	20	21	22	23	22	23	24	25	26	27	28
27	28	29	30	31			24	25	26	27	28	29	30	29	30	31				

1997

JANUARY							FEBRUARY							MARCH						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
			1	2	3	4							1							1
5	6	7	8	9	10	11	2	3	4	5	6	7	8	2	3	4	5	6	7	8
12	13	14	15	16	17	18	9	10	11	12	13	14	15	9	10	11	12	13	14	15
19	20	21	22	23	24	25	16	17	18	19	20	21	22	16	17	18	19	20	21	22
26	27	28	29	30	31		23	24	25	26	27	28		23	24	25	26	27	28	29
														30	31					

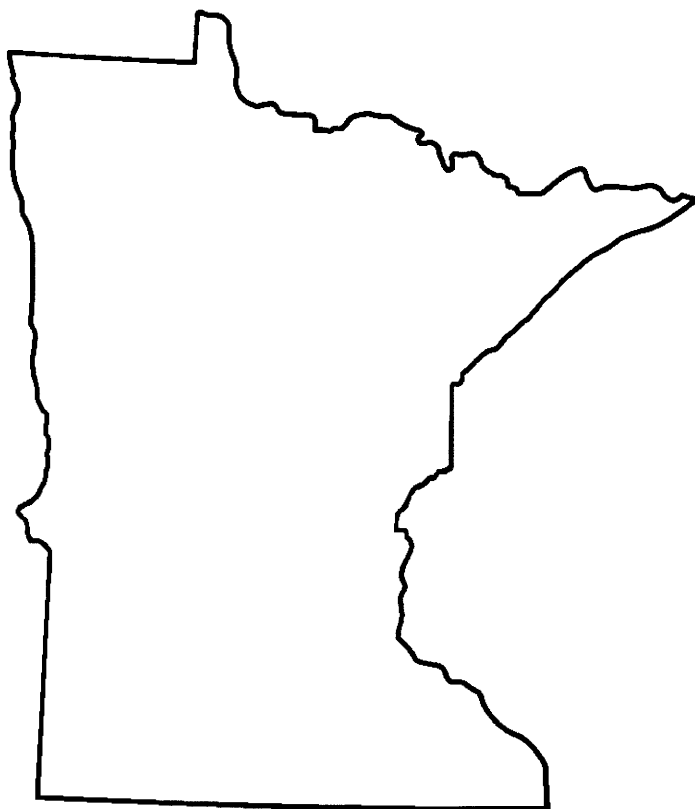
APRIL							MAY							JUNE						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
		1	2	3	4	5					1	2	3	1	2	3	4	5	6	7
6	7	8	9	10	11	12	4	5	6	7	8	9	10	8	9	10	11	12	13	14
13	14	15	16	17	18	19	11	12	13	14	15	16	17	15	16	17	18	19	20	21
20	21	22	23	24	25	26	18	19	20	21	22	23	24	22	23	24	25	26	27	28
27	28	29	30				25	26	27	28	29	30	31	29	30					

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Water Resources Data Minnesota Water Year 1997

by G. B. Mitton, K. G. Guttormson, W.W. Larson
G.W. Stratton, and E. S. Wakeman



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT MI-97-1
Prepared in cooperation with the Minnesota Department of
Natural Resources, Division of Waters; the Minnesota
Department of Transportation; and with other State,
municipal, and Federal agencies

UNITED STATES DEPARTMENT OF THE INTERIOR

BRUCE BABBITT, Secretary

U. S. GEOLOGICAL SURVEY

Thomas J. Casadevall, Acting Director

Prepared in cooperation with the
State of Minnesota
and with other agencies as listed
under cooperation

For additional information write to
District Chief, Water Resources Division
U.S. Geological Survey
2280 Woodale Drive
Mounds View, MN 55112

PREFACE

This volume of the annual hydrologic report of Minnesota is one of a series of annual reports that documents hydrologic data gathered from the U.S. Geological Survey's surface- and ground-water data-collection networks in each state, Puerto Rico, and the Trust Territories. These records of streamflow, ground-water levels, and water quality provide the hydrologic information needed by each state, Puerto Rico, and the Trust Territories. These records of streamflow, ground-water levels, and water quality provide the hydrologic information needed by state, local, and Federal agencies, and the private sector for developing and managing our Nation's land and water resources. Hydrologic data for Minnesota, including four major basins; Great Lakes, Souris-Red Rainy River, Upper Mississippi River, and Missouri River, are contained in this volume.

This report is the culmination of a concerted effort by dedicated personnel of the U.S. Geological Survey who collected, compiled, analyzed, verified, and organized the data, and who typed, edited, and assembled the report. The authors had primary responsibility for assuring that the information contained herein is accurate, complete, and adheres to U.S. Geological Survey policy and established guidelines.

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This report was prepared in cooperation with the State of Minnesota and with other agencies under the general supervision of George Garklavs, District Chief, U.S. Geological Survey, Minnesota District.

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13. ABSTRACT (Maximum 200 words) Water resources data for the 1997 water year for Minnesota consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality in wells and springs. This report contains discharge records for 101 stream-gaging stations; stage and contents for 13 lakes and reservoirs; water quality for 28 stream-gaging stations; peak flow data for 85 high-flow partial-record stations; and water levels for 16 observation wells. Additional water data were collected at various sites that are not part of the systematic data collection program, and are published as miscellaneous measurements. These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State and Federal agencies in Minnesota.				
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CONTENTS

	<u>Page</u>
Preface	iii
List of surface-water stations, in downstream order, for which records are published in this volume	vi
List of ground-water wells, by county, for which records are published in this volume	x
List of discontinued surface-water discharge or stage-only stations	xi
List of discontinued surface-water-quality stations	xvi
Introduction	1
Cooperation	1
Summary of hydrologic conditions	1
Precipitation	1
Surface water	6
Water quality	6
Ground-water levels	6
Special networks and programs	7
Explanation of the records	9
Station identification numbers	9
Records of stage and water-discharge	9
Records of surface water-quality	12
Records of ground-water levels	15
Records of ground-water quality	16
Access to USGS data	16
Definition of terms	16
Publications on Techniques of Water-Resources Investigations	22
Surface water stations	25
Ground water stations	434
Index	458

ILLUSTRATIONS

	<u>Page</u>
Figure 1. Map showing precipitation, in inches for 1997 water year, for Minnesota	2
2. Map showing precipitation, in inches for a 30-year period, for Minnesota	3
3. Graphs showing comparison of mean discharge for 1997 water year with median of mean discharge for 1961-90 at seven long-term representative gaging stations	4-5
4. Graphs showing comparison of dissolved-solids concentrations in samples collected during water year 1997 with median for period of record at three network stations	7
5. Graphs showing comparison of nitrite plus nitrate concentrations in samples collected during water year 1997 with median for period of record at three network stations	8
6. Diagram showing system for numbering wells and miscellaneous sites	9
7. Map showing location of lake- and stream-gaging stations	26
8. Map showing location of surface-water-quality stations	27
9. Map showing location of high-flow partial-record stations	371
10. Map showing location of ground-water wells	435

SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED

Note.--Data for partial-record stations and miscellaneous sites for both surface-water quantity and quality are published in separate sections of the data report. See references at the end of this list for page numbers for these sections.

[Letters after station name designates type of data: (d) discharge; (e) gage height, elevation, or contents; (c) chemical, radio-chemical, or pesticides; (b) biological or micro-biological; (p) physical (water temperature, sediment, or specific conductance)]

ST. LAWRENCE RIVER BASIN

	<u>Station Number</u>	<u>Page</u>
STREAMS TRIBUTARY TO LAKE SUPERIOR		
Pigeon River at Middle Falls, near Grand Portage	(d - - -) ...04010500.....	28
Knife River near Two Harbors	(d - - -) ...04015330.....	30
St. Louis River at Scanlon	(d - - -) ...04024000.....	32
Nemadji River:		
Deer Creek near Holyoke	(d - - -) ...04024098.....	34

HUDSON BAY BASIN

STREAMS TRIBUTARY TO LAKE WINNIPEG (head of Nelson River):

RED RIVER OF THE NORTH BASIN

Otter Tail River (head of Red River of the North):

Otter Tail River near Elizabeth	(d - - -) ...05030500.....	36
Orwell Lake (Reservoir) near Fergus Falls	(- e - -) ...05045950.....	38
Otter Tail River below Orwell Dam, near Fergus Falls	(d - - -) ...05046000.....	40
Bois de Sioux River near White Rock, SD	(d - - -) ...05050000.....	42
Bois de Sioux River near Doran	(d - c b p) ...05051300.....	44
Red River of the North at Wahpeton, ND	(d - c - p) ...05051500.....	48
Red River of the North at Hickson, ND	(d - c - p) ...05051522.....	52
Red River of the North at Fargo, ND	(d - c - p) ...05054000.....	56
Buffalo River near Hawley	(d - - -) ...05061000.....	60
South Branch Buffalo River at Sabin	(d - - -) ...05061500.....	62
Buffalo River near Dilworth	(d - - -) ...05062000.....	64
Wild Rice River at Twin Valley	(d - c - p) ...05062500.....	66
Wild Rice River at Hendrum	(d - - -) ...05064000.....	68
Red River of the North at Halstad	(d - c b p) ...05064500.....	70
Marsh River near Shelly	(d - - -) ...05067500.....	74
Sand Hill River at Climax	(d - - -) ...05069000.....	76
Red Lake River:		
Upper Red Lake at Waskish	(- e - -) ...05073500.....	78
Lower Red Lake at Battle River mouth near Saum	(- e - -) ...05073650.....	80
Lower Red Lake near Red Lake	(- e - -) ...05074000.....	82
Red Lake River at High Landing, near Goodridge	(d - - -) ...05075000.....	84
Thief River near Thief River Falls	(d - - -) ...05076000.....	86
Clearwater River at Plummer	(d - - -) ...05078000.....	88
Lost River at Oklee	(d - - -) ...05078230.....	90
Clearwater River at Red Lake Falls	(d - - -) ...05078500.....	92
Red Lake River at Crookston	(d - - -) ...05079000.....	94
Red River of the North at Grand Forks, ND	(d - c b p) ...05082500.....	96
Snake River:		
Middle River at Argyle	(d - - -) ...05087500.....	104

SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED--Continued

HUDSON BAY BASIN--continued

Red River of the North at Drayton, ND.....	(d - c b p) .05092000	106
Two Rivers:		
South Branch Two Rivers at Lake Bronson.....	(d - - -) ...05094000	110
Red River of the North at Emerson, Manitoba	(d - - -) ...05102500	112
Roseau River below South Fork near Malung	(d - - -) ...05104500	114
Roseau River at Ross.....	(d - - -) ...05107500	116
Roseau River below State ditch 51, near Caribou.....	(d - - -) ...05112000	118

LAKE OF THE WOODS BASIN

RAINY RIVER BASIN

Namakan River (head of Rainy River):

Basswood River:

Kawishiwi River near Ely	(d - - -) ...05124480	120
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Kawishiwi River near Winton	(d - - -) ...05127000	122
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Basswood River near Winton	(d - - -) ...05127500	124
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Namakan River at outlet of Lac la Croix, Ontario.....	(d - - -) ...05128000	126
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Vermilion River:

Vermilion River near Crane Lake	(d - - -) ...05129115	128
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Rainy Lake near Fort Frances, Ontario.....	(- e - -) ...05129400	130
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Rainy River:

Little Fork River:

Sturgeon River near Chisholm	(d - - -) ...05130500	132
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Nett Lake River:

Wood Duck Creek near Nett Lake	(d - - -) ...05131448	134
--------------------------------------	-----------------------------	-----

Nett Lake River near Nett Lake.....	(d - - -) ...05131455	136
-------------------------------------	-----------------------------	-----

Little Fork River at Littlefork.....	(d - - -) ...05131500	138
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Rainy River at Manitou Rapids.....	(d - - -) ...05133500	140
------------------------------------	-----------------------------	-----

Lake of the Woods (head of Winnipeg River):

Lake of the Woods at Springsteel Island near Warroad	(- e - -) ...05140521	142
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UPPER MISSISSIPPI RIVER BASIN

UPPER MISSISSIPPI RIVER MAIN STEM

Mississippi River near Bemidji	(d - - -) ...05200510	144
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Winnibigoshish Lake near Deer River	(- e - -) ...05201000	146
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Mississippi River:

Leech Lake River:

Leech Lake:

Leech Lake at Federal Dam.....	(- e - -) ...05206000	148
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Pokegama Lake near Grand Rapids.....	(- e - -) ...05210500	150
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Mississippi River at Grand Rapids	(d - - -) ...05211000	152
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Sandy River:

Sandy Lake at Libby	(- e - -) ...05218500	154
---------------------------	-----------------------------	-----

Mississippi River at Aitkin	(d - - -) ...05227500	156
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Mississippi River:

Pine River:

Pine River Reservoir at Cross Lake	(- e - -) ...05230500	158
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SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED--Continued

UPPER MISSISSIPPI RIVER BASIN--continued

Mississippi River at Brainerd	(d - - -)	05242300	160
Crow Wing River:			
Shell River:			
Straight River near Park Rapids	(d - - -)	05243725	162
Crow Wing River at Nimrod	(d - - -)	05244000	164
Long Prairie River at Long Prairie	(d - - -)	05245100	166
Gull River:			
Gull Lake near Brainerd	(- e - -)	05246500	168
Crow Wing River near Pillager	(d - - -)	05247500	170
Mississippi River near Fort Ripley	(d - - -)	05261000	172
Mississippi River near Royalton	(d - c b p)	05267000	174
Sauk River near St. Cloud	(d - c - p)	05270500	182
Mississippi River at St. Cloud	(d - - -)	05270700	186
Elk River near Big Lake	(d - c - p)	05275000	188
Crow River:			
North Fork Crow River above Paynesville	(d - c - p)	05276005	192
Crow River at Rockford	(d - - -)	05280000	204
Rum River:			
Mille Lacs Lake (head of Rum River) at Cove Bay near Onamia	(- e - -)	05284000	208
Rum River near St. Francis	(d - c - p)	05286000	210
Elm Creek near Champlin	(d - c - p)	05287890	214
Mississippi River near Anoka	(d - c - p)	05288500	220
Shingle Creek at Queen Ave. in Minneapolis	(d - c b p)	05288705	230

MINNESOTA RIVER BASIN

Little Minnesota River (head of Minnesota River) near Peever, SD	(d - - -)	05290000	242
Whetstone River near Big Stone City, SD	(d - - -)	05291000	244
Minnesota River at Ortonville	(d - - -)	05292000	246
North Fork Yellow Bank River near Odessa	(d - - -)	05292704	248
Yellow Bank River near Odessa	(d - - -)	05293000	250
Pomme de Terre River at Appleton	(d - - -)	05294000	252
Lac qui Parle River near Lac qui Parle	(d - - -)	05300000	254
Chippewa River near Milan	(d - - -)	05304500	256
Minnesota River at Montevideo	(d - - -)	05311000	258
Yellow Medicine River near Granite Falls	(d - - -)	05313500	260
Redwood River near Marshall	(d - - -)	05315000	262
Redwood River near Redwood Falls	(d - - -)	05316500	264
Cottonwood River near New Ulm	(d - - -)	05317000	266
Little Cottonwood River near Courtland	(d - - -)	05317200	268
Blue Earth River:			
Watonwan River near Garden City	(d - - -)	05319500	270
Blue Earth River near Rapidan	(d - - -)	05320000	272
Le Sueur River:			
Cobb River:			
Little Cobb River near Beauford	(d - c - p)	05320270	274
Le Sueur River near Rapidan	(d - - -)	05320500	286
Minnesota River at Mankato	(d - c b p)	05325000	288
High Island Creek near Henderson	(d - - -)	05327000	296
Minnesota River near Jordan	(d - c - p)	05330000	298

SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED--Continued

UPPER MISSISSIPPI RIVER BASIN

Mississippi River at St. Paul.....	(d - - -)	..05331000	310
Mississippi River below Lock and Dam 2, at Hastings.....	(d - c - p)	..05331580	312

ST CROIX RIVER BASIN

St. Croix River:			
Kettle River below Sandstone	(d - c - p)	..05336700	320
Snake River:			
Knife River near Mora.....	(d - - -)	..05337400	324
SNAKE RIVER near Pine City	(d - c - p)	..05338500	326
St. Croix River at St. Croix Falls, WI.....	(d - - -)	..05340500	330
Mississippi River at Prescott, WI	(d - - -)	..05344500	332
Vermillion River near Empire	(d - c - p)	..05345000	334
Cannon River:			
Straight River near Faribault	(d - c - p)	..05353800	338
Cannon River at Welch.....	(d - c - p)	..05355200	342
Mississippi River at Red Wing, MN.....	(d - c - p)	..05355250	346
Zumbro River:			
South Fork Zumbro River at Rochester	(d - - -)	..05372995	354
Whitewater River near Beaver.....	(d - - -)	..05376800	356
Mississippi River at Winona.....	(d - - p)	..05378500	358
Root River near Houston	(d - - -)	..05385000	362
Iowa River:			
Cedar River near Austin	(d - - -)	..05457000	364
Des Moines River at Jackson.....	(d - - -)	..05476000	366

MISSOURI RIVER:

Big Sioux River:

Rock River at Luverne	(d - c b p)	..06483000	368
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**GROUND-WATER WELLS, BY COUNTY, FOR WHICH
RECORDS ARE PUBLISHED IN THIS VOLUME**

GROUND-WATER LEVELS

	<u>Page</u>
ANOKA	
Well 450927093033802 Local number 031N22W23CBC02.....	436
BLUE EARTH	
Well 440050094102801 Local number 106N28W03DBA01	437
CLAY	
Well 465237096383901 Local number 139N47W05CDC01	438
DAKOTA	
Well 445330093054301 Local number 028N22W19DCC02	439
Well 444205092500001 Local number 114N17W10AAA01	440
HENNEPIN	
Well 444801093202801 Local number 027N24W30BDA01	441
Well 450116093205301 Local number 029N24W06CCC01.....	442
Well 445740093333001 Local number 117N23W11BBD01	443
Well 450223093231801 Local number 118N21W07DCB01	444
MORRISON	
Well 460444094212501 Local number 130N29W08DCC01	445
RAMSEY	
Well 445700093051001 Local number 029N22W31DDD01	446
Well 450238093082501 Local number 030N23W35BDC01	447
SCOTT	
Well 444427093353901 Local number 115N23W28BDD01	448
Well 444427093353902 Local number 115N23W28BDD02	449
Well 444427093353903 Local number 115N23W28BDD03	450
WATONWAN	
Well 440037194372601 Local number 106N32W01DDB01	451

QUALITY OF GROUND-WATER RECORDS

HENNEPIN	454
MILLE LACS	455
REDWOOD	456
ROCK	457

DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

The following continuous-record surface-water discharge or stage-only stations (gaging stations) in Minnesota have been discontinued. Daily streamflow or stage records were collected and published for the period of record, expressed in water years, shown for each station. Those stations with an asterisk (*) after the station number are currently operated as crest-stage partial-record stations. Discontinued project stations with less than 3 years of record have not been included. Information regarding these stations may be obtained from the District Office at the address given on the back side of the title page of this report.

[Letters after station name designate type of data collected: (d) discharge, (e) elevation (stage only)].

Station name	Station number	Drainage area (mi ²)	Period of record
Pigeon River above mouth of Arrow River, MN (d)	04010000	256	1924-27
Poplar River at Lutsen, MN (d)	04012500	114	1911 (e), 1912-17, 1928-47, 1952-61
Cross River at Schroeder, MN (d)	04013000	91	1931-32
Baptism River near Beaver Bay, MN (d)	04014500	140	1928-93
Beaver Creek (Beaver Bay Run) at Beaver Bay, MN (d)	04015000	126	1911-14, 1928-31
South Branch Partridge River near Babbitt, MN (d)	04015455	18.5	1977-80
Partridge River above Colby Lake, at Hoyt Lakes, MN (d)	04015475	106	1979-88
Second Creek near Aurora, MN (d)	04015500	29	1955-80
Partridge River near Aurora, MN (d)	04016000	161	1942-82
St. Louis River near Aurora, MN (d)	04016500	290	1942-87
Embarrass River at Embarrass, MN (d)	04017000	93.8	1942-64
Embarrass River near McKinley, MN (d)	04018000	171	1953-62
St. Louis River at Forbes, MN (d)	04018750	713	1965-90
East Two Rivers near Iron Junction, MN (d)	04018900	40.0	1966-79
West Two Rivers near Iron Junction, MN (d)	04019000	65.3	1953-62, 1965-79
West Swan River near Silica, MN (d)	04019300	16.3	1963-79
East Swan River near Toivola, MN (d)	04019500	112	1953-62, 1964-71
Swan River near Toivola, MN (d)	04020000	254	1952-61
Whiteface River below (at) Meadowlands, MN (d)	04021000	453	1909-17
Cloquet River at Independence, MN (d)	04023000	750	1909-17
Elim Creek near Holyoke, MN (d)	04024090	1.06	1976-78
Skunk Creek below Elim Creek near Holyoke, MN (d)	04024093	8.83	1976-78
Otter Tail River near Detroit Lakes, MN (d)	05030000	270	1937-71
Pelican River at Detroit Lakes, MN (d)	05033900	-	1968-71
Pelican River at Detroit Lk. out. nr. Detroit Lakes, MN (d)	05034100	-	1968-71, 1974-75
Long Lake outlet near Detroit Lakes, MN (d)	05035100	-	1968-71
West Branch Cty. Ditch No. 14 nr. Detroit Lakes, MN (d)	05035200	-	1968-71
East Branch County Ditch No. 14 nr. Detroit Lakes, MN (d)	05035300	-	1968-71
St. Clair Lake outlet near Detroit Lakes, MN (d)	05035500	-	1968-75
Pelican River at Muskrat Lk outlet nr Detroit Lakes, MN (d)	05035600	-	1968-75
Pelican River at Sallie Lk outlet nr Detroit Lakes, MN (d)	05037100	-	1968-75
Pelican River at Lake Melissa olt nr Detroit Lakes, MN (d)	05039100	-	1968-75
Pelican River near Detroit Lakes, MN (d)	05040000	123	1942-53
Pelican River near Fergus Falls, MN (d)	05040500	482	1909-12
Otter Tail River near Breckenridge, MN (d)	05046500	2,040	1931-32, 1939-46
Mustinka River (head of Bois de Sioux River) nr Norcross, MN (d)	05047000	-	1940-47
Mustinka Ditch above West Branch Mustinka River (Twelve Mile Creek) near Charlesville, MN (d)	05047500	-	1943-55
Mustinka Ditch below West Branch Mustinka River (Twelve Mile Creek) near Charlesville, MN (d)	05048000	-	1943-55
W. Branch Mustinka River (Twelve Mile Creek) below Mustinka Ditch near Charlesville, MN (d)	05048500	-	1943-55
Mustinka River above Wheaton, MN (d)	05049000	834	1915-24, 1930-58
Bois de Sioux River below Fairmont, ND (d)	05050500	1,540	1919-44
Rabbit River at Campbell, MN (d)	05051000	266	1942-52

DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS--Continued

Station name	Station number	Drainage area (mi ²)	Period of record
Red River of the North below Fargo, ND (d)	05054020	-	1960-78
Whiskey Creek at Barnesville, MN (d)	05061200*	25.3	1964-66
Wild Rice River near Ada, MN (d)	05063000	1,100	1948-54
South Branch Wild Rice River near Borup, MN (d)	05063500	254	1944-49
Marsh River below Ada, MN (d)	05067000	-	1948-52
Sand Hill River at Beltrami, MN (d)	05068000	324	1943-58
Sand Hill Ditch at Beltrami, MN (d)	05068500	-	1943-58
Red Lake River near Red Lake, MN (d)	05074500	1,950	1933-94
Thief River near Gatske, MN (d)	05075500	-	1953-56
Red Lake River at Thief River Falls, MN (d)	05076500	3,450	1900-18, 1920-30
Clearwater River near Pinewood, MN (d)	05077000	132	1940-45
Clearwater River near Leonard, MN (d)	05077500	153	1934-47
Ruffy Brook near Gonvick, MN (d)	05077700*	45.2	1960-78
Red River of the North at Oslo, MN (d)	05083500	31,200	1936-37, 1941-43, 1945-60, 1973-78
Snake River at Warren, MN (d)	05085500	-	1945, 1953-56
Snake River above Alvarado, MN (d)	05085900	218	1993-96
Snake River at Alvarado, MN (d)	05086000	220	1945, 1953-56
Middle River near Strandquist, MN (d)	05087000	-	1953-56
Tamarac River near Strandquist, MN (d)	05090500	-	1953-56
Tamarac River near Stephen, MN (d)	05091500	320	1945
Two Rivers (Middle Fork Two Rivers) nr Hallock, MN (d)	05092500	131	1931-38
South Branch (South Fork) Two Rivers near Pelan, MN (d)	05093000	281	1927-38, 1953-56
South Branch Two Rivers (Two Rivers) at Hallock, MN (d)	05094500	-	1940-47
Two Rivers (South Branch Two Rivers) at Hallock, MN (d)	05095000	-	1911-14, 1929-30, 1937-39, 1941-43
Two Rivers below Hallock, MN (d)	05095500	644	1945-55
North Branch (North Fk) Two Rivers nr Lancaster, MN (d)	05096000	32	1927-38, 1941-55
State Ditch 85 near Lancaster, MN (d)	05096500	95	1927-38, 1942-55
North Branch Two Rivers at Lancaster, MN (d)	05096500	209	1941-42, 1953-56
North Branch Two Rivers near Northcote, MN (d)	05097500	386	1941-42, 1945-51
Two Rivers below North Branch near Hallock, MN (d)	05098000	1,060	1941-43
Roseau River (at) near Malung, MN (d)	05103000	252	1927-46
South Fork (W. Branch) Roseau River nr Malung, MN (d)	05104000	312	1911-14, 1928-46
Roseau River at Roseau, MN (d)	05105000	-	1947-47
Roseau River near Roseau, MN (d)	05105500	-	1937-60
Sprague Creek near Sprague, Manitoba (d)	05106000	176	1927-81
Pine Creek near Pine Creek, MN (d)	05107000	74.6	1927-53
Roseau River at Roseau Lake, MN (e)	05106500	-	1937-91
Roseau River near Badger, MN (d)	05108000	-	1927-69
Roseau River near Duxby, MN (d)	05108500	-	1927-51, 1952-56
Badger Creek near Badger, MN (d)	05109000	2.2	1927-30, 1931-38
Roseau River near Haug, MN (d)	05109500	-	1932-66
Roseau River at otl of State Ditch 69 nr Oak Point, MN (d)	05110000	-	1937-42
Roseau R. at head of State Ditch 51 nr Oak Point, MN (d)	05110500	-	1933-42
Roseau River at Oak Point, MN (d)	05111000	-	1933-39, 1941-60

DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS--Continued

Station name	Station number	Drainage area (mi ²)	Period of record
Roseau River at international boundary, nr Caribou, MN (d)	05112500	1,590	1933-65
Shagawa Lake tributary at Ely, MN (d)	05127219	1.84	1971-78
Burgo Creek near Ely, MN (d)	05127220	3.04	1967-78
Shagawa River near Ely, MN (d)	05127230	99	1967-78
Vermilion Lake near Soudan, MN (e)	05128200	-	1913-15, 1941-42
			1946-87
Pike River near Biwabik, MN (d)	05128340	-	1977-78
Pike River near Embarrass, MN (d)	05128500	115	1953-64, 1976-79
Gold Portage Oult from Kabetogama Lake near Ray, MN (d)	05129290	-	1982-93
Rainy River at International Falls, MN (d)	05129500	14,900	1905-60
Sturgeon River (Lake) at Side Lake, MN (d)	05130000	-	1938-47
Dark River near Chisholm, MN (d)	05131000	50.6	1942-61, 1965-79
Deer Lake outlet (Deer Lake) near Effie, MN (d)	05131800	-	1937-39, 1940-46
Big Fork River at Big Falls, MN (d)	05132000	1,460	1909-10, 1928-79
			1982-93
Rapid River near Baudette, MN (d)	05134200	543	1956-85
Warroad River near Warroad, MN (d)	05139500	162	1946-80
Bulldog Run near Warroad, MN (d)	05140000	14.2	1946-51, 1966-77
East Branch Warroad River nr Warroad, MN (d)	05140500	102	1946-54, 1966-77
			1979-94
Lake of the Woods at Warroad, MN (e)	05140520	27,200	1979-94
Williams lake near Akeley, MN (e)	05202000	0.88	1988-96
Mississippi River near Deer River, MN (d)	05210000	3,190	1945-50
Prairie River near Taconite, MN (d)	05212700	360	1967-83
Prairie River near Grand Rapids, MN (d)	05213000	485	1909 (e), 1925-49
O'Brien Creek near Pengilly, MN (d)	05216800	-	1963-68
Initial tailings basin outflow near Keewatin, MN (d)	05216820	2.5	1982-85
Swan River near Calumet, MN (d)	05216850	114	1964-90
Swan River near Warba, MN (d)	05217000	254	1954-69
Mississippi River above Sandy River near Libby, MN (d)	05218000	4,560	1895-1915, 1925-29
Mississippi River below Sandy River near Libby, MN (d)	05220500	5,060	1930-90
Pelican Brook (Long Lake) near Pequot Lakes, MN (d)	05232000	-	1938-42, 1943-47
Rabbit River near Crosby, MN (d)	05241500	8.38	1945-63
Little Sand Lake outlet (Sand Lake outlet) nr Dorset, MN (d)	05242700	74	1930-41
Straight River at County Highway 125 near Osage, MN (d)	05243721	-	1986-91
Straight River at Cty. Hwy. 115 near Park Rapids, MN (d)	05243723	-	1986-89
Crow Wing River at Motley, MN (d)	05244500	2,140	1909 (e), 1913-17
			1930-31
Diversion from Long Prairie River near Osakis, MN (d)	05244980	-	1939-47
Long Prairie River near Osakis, MN (d)	05245000	-	1949-54
Long Prairie near Motley	05245500	973	1909-17, 1930-31
Crow Wing River at Pillager, MN (d)	05246000		1909-13, 1925-50
Platte (Platt) River at Pillager, MN (d)	05268000*	338	1929-36
Mississippi River near Sauk Rapids, MN (d)	05269000	12,400	1903-06
Mississippi River at Sartell, MN (d)	05270000	12,450	1929, 1943-47(e)
Clearwater River at Clearwater, MN (d)	05273500	-	1937, 1940-42
St. Francis River at Santiago, MN (d)	05274700	-	1965-70, 1980-81

DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS--Continued

Station name	Station number	Drainage area (mi ²)	Period of record
St. Francis River above Zimmerman, MN (d)	05274750	-	1981-84
St. Francis River near Big Lake, MN (d)	05274900	-	1965-70
Mississippi River at Elk River, MN (d)	05275500	14,500	1915-56
North Fork Crow River near Regal, MN (d)	05276000	215	1943-54
Middle Fork Crow River at New London, MN (e)	05277000	-	1930-42, 1943-47
Middle Fork Crow River (Calhoun Lk Diversion) nr Spicer, MN (e)	05277500	-	1930, 1940-46
Middle Fork Crow River near Spicer, MN (d)	05278000	179	1949-87
South Fork Crow River at Cosmos, MN (d)	05278500	221	1945-64
Buffalo Creek near Glencoe, MN (d)	05278930*	374	1972-80
South Fork Crow River near Mayer, MN (d)	05279000	1,170	1934-79
South Fork Crow River near Rockford, MN (d)	05279500	1,250	1900-12
Mississippi River at Anoka, MN (d)	05283500	17,100	1897, 1905-13
Rum River at Onamia, MN (d)	05284500	414	1910-12
Rum River at Spencer Brook, MN (d)	05284750	-	1960-64
Rum River at Cambridge, MN (d)	05285000	1,160	1900-14
Rum River near Anoka, MN (d)	05286500	1,430	1900-06, 1909
Minnetonka Lake (head of Minnehaha Creek) near Wayzata (at Excelsior), MN (d)	05289000	-	1930-64
Minnehaha Creek at Minnetonka Mills, MN (d)	05285900	130	1953-64
Big Stone Lake near Big Stone City, SD (formerly Big Stone Lake at Ortonville, MN (e)	05291500	-	1937-93
Minnesota River near Odessa, MN (d)	05292500	1,340	1900-12, 1944-63
Pomme de Terre River near Morris, MN (d)	05293500	-	1937-39, 1940-47
Canby Creek at Canby, MN (d)	05299500	-	1930-39, 1940-46
Minnesota River near Lac qui Parle, MN (d)	05301000	4,050	1942-94
Chippewa River at diversion dam near Hancock, MN (d)	05303000	-	1930-39, 1940-46
Chippewa River at Benson, MN (d)	05303500	1,270	1940-51
Shakopee Creek near Benson, MN (d)	05304000	352	1940-54
Chippewa River near Watson, MN (d)	05305000	2,050	1910-17, 1931-36
South Branch Yellow Medicine River at Minneota, MN (d)	05311400	111	1960-81, 1983-87
Spring Creek near Hazel Run, MN (d)	05312500	101	1940-48
Chetomba Creek near Maynard, MN (d)	05314000	200	1940-51
Hawk Creek near Maynard, MN (d)	05314500*	474	1940-54
Prairie Ravine near Marshall, MN (d)	05315200	5.63	1950-64
Redwood River near Green Valley, MN (d)	05315500	436	1947-57
Minnesota River at New Ulm, MN (d)	05316770	9,536	1960-76
Dry Creek near Jeffers, MN (d)	05316900	3.13	1982-85
Minnesota River at Judson, MN (d)	05317500	11,200	1930-50
East Branch (East Fork) Blue Earth River near Briceyn, MN (d)	05318000	132	1951-70
South Fork Watonwan River at diversion dam near St. James, MN (d)	05319000	-	1930, 1940-46
Blue Earth River at Mankato, MN (d)	05321000	3,550	1930-39, 1940-42
Sand Creek at diversion dam near Jordan, MN (d)	05330400	-	1930-39, 1940-46
Purgatory Creek at Eden Prairie, MN (d)	05330800	-	1970-80
Nine Mile Creek at Bloomington, MN (d)	05330900	-	1963-73
Glaishy Brook near Kettle River, MN (d)	05336200*	24.2	1950-70
Kettle River near Sandstone, MN (d)	05336500	825	1900-16
Grindstone River at Hinckley, MN (d)	05337000	-	1940-47
Snake River at Mora, MN (d)	05337500	422	1900-13
St. Croix River near Rush City, MN (d)	05339500	5,120	1923-61
Sunrise River near Stacy, MN (d)	05340000	167	1940-65
Sunrise River near Lindstrom, MN (d)	05340050	231	1965-85

DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS--Continued

Station name	Station number	Drainage area (mi ²)	Period of record
Vermillion River at Hastings, MN (d)	05346000	195	1942-47, 90
South Fork Zumbro River near Rochester, MN (d)	05373000	304	1952-81
Zumbro River (South Branch) near Zumbro Falls, MN (d)	05373500	821	1911-17
Zumbro River at Zumbro Falls, MN (d)	05374000*	-	1909-17, 1929-80
Zumbro River at Theilman, MN (d)	05374500	1,320	1938-56
Zumbro River at Kellogg, MN (d)	05374900	1,400	1975-90
North Fork Whitewater River near Elba, MN (d)	05376000	101	1939-41, 1967-93
Middle Fork Whitewater River near St. Charles, MN (d)	05376100	-	1988-92
South Fork Whitewater River near Altura, MN (d)	05376500	76.8	1939-71
Whitewater River at Beaver, MN (d)	05377500	288	1936-38, 1939-56
Stockton Valley Creek at Stockton, MN (d)	05378230	-	1982-85
Garvin Brook near Minnesota City, MN (d)	05378235	-	1982-91
Straight Valley Creek near Rollingstone, MN (d)	05378300	5.16	1970-85
Gilmore Creek at Winona, MN (d)	05379000	8.95	1939-63
Mississippi River at LaCrosse, WI (d)	05383500	-	1929-55
North Branch Root River tributary near Stewartville, MN (d)	05383600	0.73	1959-64
Root River near Lanesboro, MN (d)	05384000*	615	1910, 11-17, 1940-85, 1987-90
Rush Creek near Rushford, MN (d)	05384500*	129	1942-79
South Fork Root River near Houston, MN (d)	05385500*	275	1953-83
Root River below South Fork near Houston, MN (d)	05386000	1,560	1938-61
Turtle Creek near Austin, MN (d)	05456500	144	1947-51
Heron Lake outlet nr Heron Lake, MN (d)	05475000	-	1930-43
Little Sioux River near Lakefield, MN (d)	06603000	17.1	1948-63
Jackson County Ditch No. 11 near Lakefield, MN (d)	06603500	7.69	1948-61

DISCONTINUED SURFACE-WATER-QUALITY STATIONS

The following abbreviations designate type of record collected: C., chemical; Bio., biological; Sed., sediment; Temp., water temperature; D.O., dissolved oxygen;

Station name	Station number	Drainage area (mi ²)	Type of record	Period of record
Baptism River near Beaver Bay, MN	04014500	140	C., Bio., Sed., Temp., D.O., pH, S.C.	1968-93
Partridge River abv Colby Lake at Hoyt Lakes, MN	04015475	106	Temp., S.C.	1975-85
St. Louis River at Forbes, MN	04018750	713	Sed.	1968-70
St. Louis River at Scanlon, MN	04024000	3430	C., Bio., Sed., Temp., D.O., pH, S.C.	1953-66, 68-94
Elim Creek near Holyoke, MN	04024090	1.06	Sed.	1975-79
Skunk Creek below Elim Creek near Holyoke, MN	04024093	8.83	C., Sed., Temp., D.O., pH, S.C.	1975-79
Deer Creek near Holyoke, MN	04024098	7.77	C., Bio., Temp., D.O., pH, S.C.	1977-79
			Sed.	1977-81
Otter Tail River below Orwell Dam, near Fergus Falls, MN	05046000	1740	C., Sed., Temp., D.O., pH, S.C.	1961-63, 65-66, 85-86, 93-95
Bois de Sioux River near Doran, MN	05051300	1880	C., Sed., Temp., D.O., pH, S.C.	1993-95
Buffalo River near Dilworth, MN	05062000	1040	Sed.	1971-81
Clearwater River at Red Lake Falls, MN	05078500	1370	C., Sed., Temp., D.O., pH, S.C.	1964-66, 79, 92, 95
Red Lake River at Crookston, MN	05079000	5270	C., Sed., Temp., D.O., pH, S.C.	1962, 74-76, 79-95
Snake River above Alvarado, MN (d)	05085900	218	C., Temp., D.O., pH, S.C.	1994-96
Roseau River below Roseau	05105300		C., Bio., Sed., Temp., D.O., pH, S.C.	1973-83
Roseau River below State Ditch 51, near Caribou, MN	05112000	1560	C., Bio., Sed., Temp., D.O., pH, S.C.	1972-95
Kawishiwi River near Ely, MN	05124480	253	C., Bio., Sed., Temp., D.O., pH, S.C.	1965-96
Little Fork River at Littlefork, MN	05131500	1730	C., Bio., Sed., Temp., D.O., pH, S.C.	1967, 69, 71, 73-86
Big Fork River at Big Falls, MN	05132000	1460	C., Bio., Sed., Temp., D.O., pH, S.C.	1968, 71-77
Rainy River at Manitou Rapids, MN	05133500	19,400	C., Bio., Sed., Temp., D.O., pH, S.C.	1968-70, 78-94
Elk River near Big Lake, MN	05275000	615	Sed., Temp.	1975-81
Crow River at Rockford, MN	05280000	2520	Sed., Temp.	1975-81
Mississippi River near Anoka, MN	05288500	19100	Sed.	1963-67, 75-96
Mississippi River at Fridley, MN	05288550		Temp., D.O., pH, S.C.	1975-86
Mississippi River at Ford Plant at St. Paul, MN	05288950	19,700	Temp., D.O., pH, S.C.	1974-78, 81-82
Whetstone River near Big Stone City, SD	05291000	389	Sed., Temp.	1974-88
Yellow Bank River near Odessa, MN	05293000	398	Sed., Temp.	1974-88
Chippewa River near Milan, MN	05304500	1870	Sed., Temp.	1972-81
Yellow Medicine River near Granite Falls, MN	05313500	653	Sed., Temp.	1971-75, 77-81
Redwood River near Marshall, MN	05315000	259	Sed., Temp.	1968-71
Redwood River near Redwood Falls, MN	05316500	629	Sed., Temp.	1968-70
Cottonwood River near New Ulm, MN	05317000	1280	C., Bio., Temp., D.O., pH, S.C.,	1961-62, 64-68, 71-72, 74-76, 89-92, 95
			Sed.,	1968-76
Watsonwan River near Garden City, MN	05319500	812	Sed.	1977-80
Minnesota River at Burnsville, MN	05330908		Temp., D.O., pH, S.C.	1982-83
Minnesota River at Fort Snelling State Pk., St. Paul, MN	05330920	16,900	Temp., D.O., pH, S.C.	1973-83
Mississippi River at Industrial Molasses, St. Paul, MN	05331005		Temp., D.O., pH, S.C.	1975-85
Mississippi River at Fifth at Newport, MN	05331545		Temp., D.O., pH, S.C.	1977-90
Mississippi River at Grey Cloud Island near Cottage Grove, MN	05331560		Temp., D.O., pH, S.C.	1977-90
Mississippi River at Ninninger	05331570	37,000	C., Bio., Sed., Temp., D.O., pH, S.C.,	1977-95
Mississippi River at Lock and Dam 2 at Hastings, MN	05331578		Temp., D.O., pH, S.C.	1975-90
Snake River near Pine City, MN	05338500	958	C., Bio., Temp., D.O., pH, S.C.	1963, 65, 67-68, 75-83, 85, 92-94
St. Croix River at Afton, MN	05341770		Temp., D.O., pH, S.C.	1977-83
Vermillion River near Empire, MN	05345000	110	Temp., D.O., pH, S.C.	1974-91
			C., Bio.	1992-91
Mississippi River at Lock and Dam 3 near Red Wing, MN	05344980	46,000	Temp., D.O., pH, S.C.	1975-83
South Fork Zumbro River at Rochester, MN	05372995	303	Sed., Temp.	1981-82
Zumbro River at Kellogg, MN	05374900	1400	Sed., Temp.	1975-81
North Fork Whitewater River near Elba, MN	05376000	101	C., Bio., Sed., Temp., D.O., pH, S.C.	1967-93
Middle Fork Whitewater River near St. Charles, MN	05376100		Sed., Temp., S.C.	1982-92
Whitewater River near Beaver, MN	05376800	271	Sed., Temp.	1975-81
Mississippi River at Winona, MN	05378500	59,200	C., Bio., D.O., pH	1963-66, 76-88
Root River near Houston, MN	05385000	1270	Sed., Temp.	1975-81
South Fork Root River near Houston, MN	05385500	275	Sed., Temp.	1975-81
Cedar River near Austin, MN	05457000	425	Sed., Temp., S.C.	1971, 73-75, 78-81
Des Moines River at Jackson, MN	05476000	1220	C., Bio., D.O., pH, S.C.	1968-69, 73-76, 78, 83, 89-90, 94-95
			Sed., Temp	1968-81

INTRODUCTION

Water Resources Division of the U.S. Geological Survey, in cooperation with State agencies, obtains a large amount of data pertaining to the water resources of Minnesota each water year. These data, accumulated during many years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside the Geological Survey, the data are published annually in this report series entitled 'Water Resources Data - Minnesota'.

Water resources data for the 1997 water year for Minnesota consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground water. This volume contains discharge records for 101 stream-gaging stations; stage and contents for 13 lakes and reservoirs; water quality for 28 stream-gaging stations; peak flow data for 85 high-flow partial-record stations; and water levels for 16 observation wells. These data represent a part of the National Water Data System collected by the U.S. Geological Survey and cooperating State and Federal agencies in Minnesota.

This series of annual reports for Minnesota began with the 1961 water year with a report that contained only data relating to the quantities of surface water. For the 1964 water year, a similar report was introduced that contained only data relating to water quality. Beginning with the 1975 water year, the report was changed to present, in one volume, data on quantities of surface water, quality of surface and ground water, and ground-water levels.

Prior to introduction of this series and for several water years concurrent with it, water-resources data for Minnesota were published in U.S. Geological Survey Water-Supply Papers. Data on stream discharge and stage and on lake or reservoir contents and stage, through September 1960, were published annually under the title "Surface-Water Supply of the United States, Parts 4, 5 and 6A." For the 1961 through 1970 water years, the data were published in two 5-year reports. Data on chemical quality, temperature, and suspended sediment for the 1941 through 1970 water years were published annually under the title "Quality of Surface Waters of the United States," and water levels for the 1935 through 1974 water years were published under the title "Ground-Water Levels in the United States." The above mentioned Water-Supply papers can be consulted in the libraries of the principal cities of the United States and may be purchased from the books and Open-File Reports Section, Federal Center, Box 25425, Denver, Colorado 80225.

Publications similar to this report are published annually by the Geological Survey for all States. These official Survey reports have an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and volume number. For example, this volume is identified as the "U.S. Geological Survey Water-Data Report MN-97-1. For archiving and general distribution, the reports for 1971-1974 water years also are identified as water-data reports. These water-data reports are for sale in paper copy or in microfiche by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161.

Additional information, including current prices, for ordering specific reports may be obtained from the District Chief at the address given on the back of the title page or by telephone (612) 783-3100.

COOPERATION

The U.S. Geological Survey and agencies of the State of Minnesota have had cooperative agreements for the systematic collection of streamflow records since 1909, for ground-water levels since 1948, and for water-quality records since 1952. Organizations that assisted in collecting data through cooperative agreement with the Survey are:

Minnesota Department of Natural Resources
Minnesota Department of Transportation
Minnesota Pollution Control Agency
Red Lake Watershed Management Board
Grand Portage Reservation Tribal Council
Beltrami Soil and Water Conservation District
Elm Creek Conservation Commission
Red River Watershed Management Board
City of Rochester
Bois Forte Reservation Tribal Council

Assistance in the form of funds or services was given by the U.S. Army Corps of Engineers, U.S. Department of State, and the Federal Energy Regulatory Commission. Other organizations that supplied data are acknowledged in station descriptions.

SUMMARY OF HYDROLOGIC CONDITIONS

Precipitation

Most of Minnesota received greater than normal¹ ('normal' being the statistical median based on data from 1961-90, fig. 1) precipitation during the 1997 water year (fig. 2), with the exception of the northwest. Precipitation departures from normal for the northwest were about 1.0 inch below normal, while for other regions ranged from 0.2 to 8.6 inches above normal. Statewide, the precipitation totals for the 1997 water year averaged 3.3 inches above normal.

Precipitation totals for part of the first quarter, October through November 1996, were in excess of the 90th percentile for all of west-central Minnesota and in some places in the extreme west-central portion, exceeded the 99th percentile. Notable storm events produced precipitation totals in excess of 1.0 inches on Oct. 17 and Oct. 30 at several reporting stations.

The winter of 1996-97 was one of the most severe on record particularly in western Minnesota. The upper reaches of the Red River of the North and the Minnesota River basins were particularly hard hit. By the end of January most of Minnesota had already received 100 to 200 percent of the normal snowfall totals for an entire winter, and by the end of the winter these totals were typically at or above the 75 percent of normal.

Precipitation totals for the first two quarters, October, 1996 through March, 1997, were over 10 inches in most of west-central Minnesota. Much of this moisture was held in snow pack until spring runoff. Snowpack moisture-content readings taken in late winter were in excess of 4 inches throughout all of western Minnesota, and in several locations readings in excess of 5 and 6 inches were noted. These moisture content levels were as high as has ever been measured in this area.

The third quarter (April through June) began with a rain event on April 6-7 which added another 1 to 3 inches of precipitation on an already moisture-saturated landscape. The heaviest amounts fell in west-central Minnesota which had received most of the fall and winter precipitation. Following the storm in early April, the remainder of the third quarter had near-normal precipitation.

The last quarter, July to September, began with storms producing heavy rains. Parts of the Minneapolis-St. Paul metropolitan area recorded rainfall totals up to 4 inches from the July 1 storm, causing significant increase in flows of nearby streams (fig. 3, Crow River near Rockford). The same weather system produced 4.2 inches at Red Lake Falls and 4.9 inches at Caribou in northwestern Minnesota. At the Minneapolis-St. Paul airport, 12.6 inches of precipitation fell during the entire month of July, which was over 9 inches above normal. For the period, July through September, 21.8 inches fell which was 12.0 inches above normal.

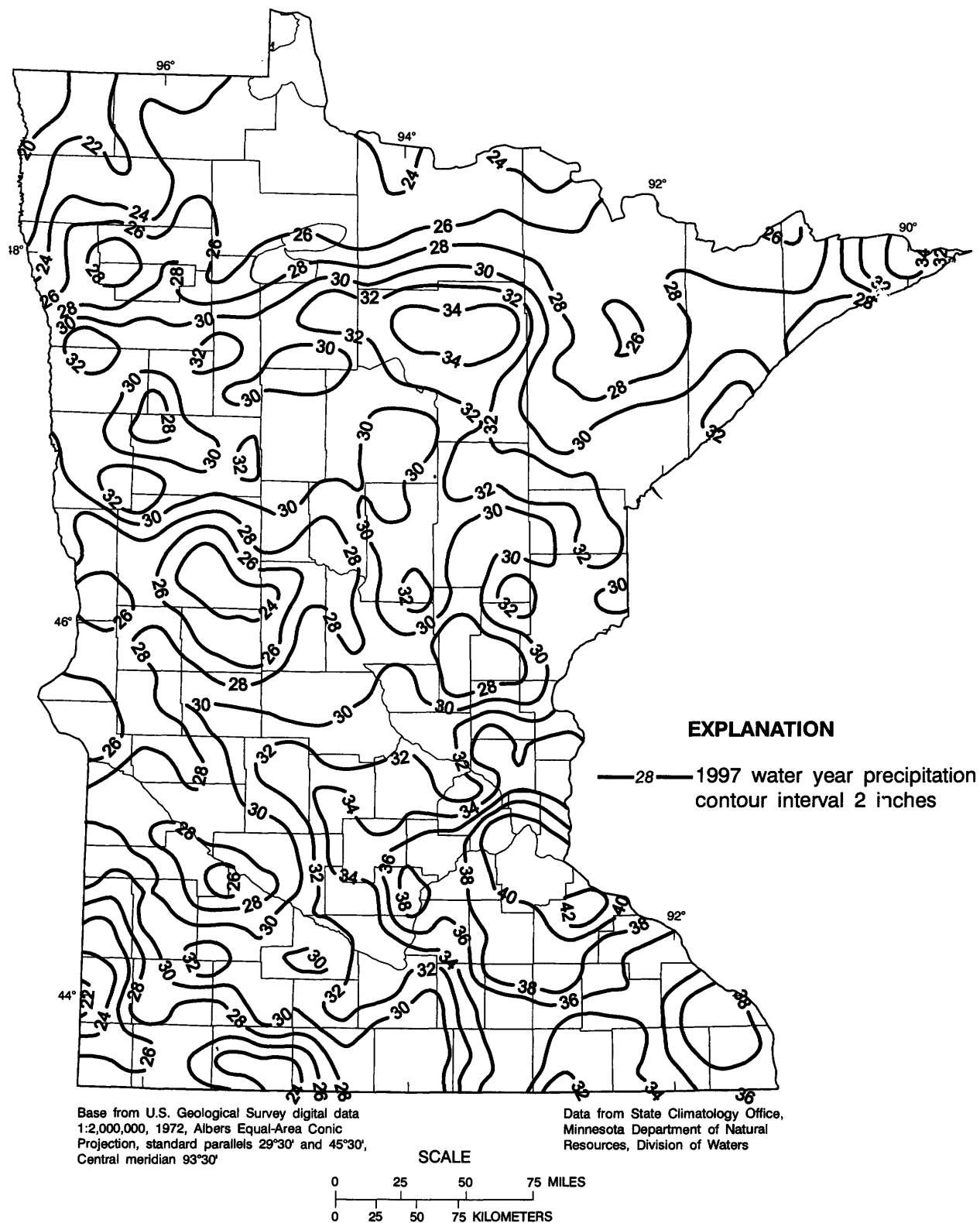


Figure 1.—Precipitation, in inches, during 1997 water year in Minnesota.

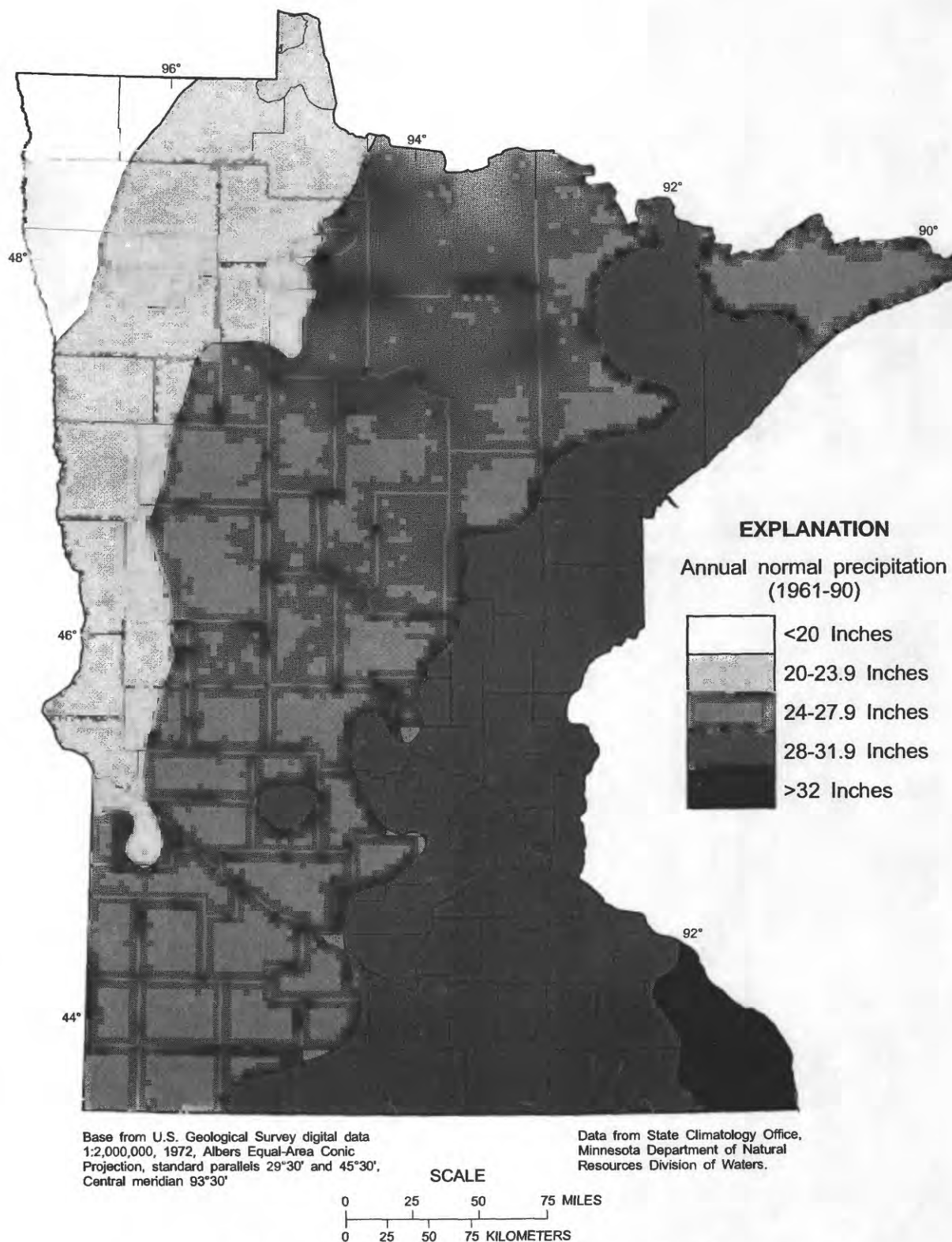
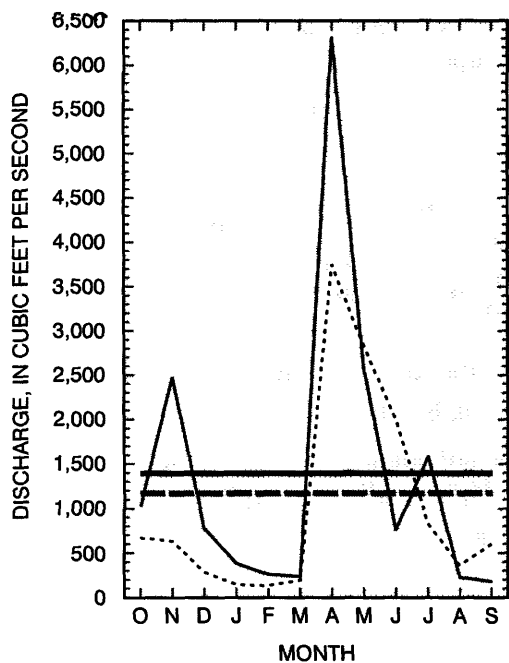
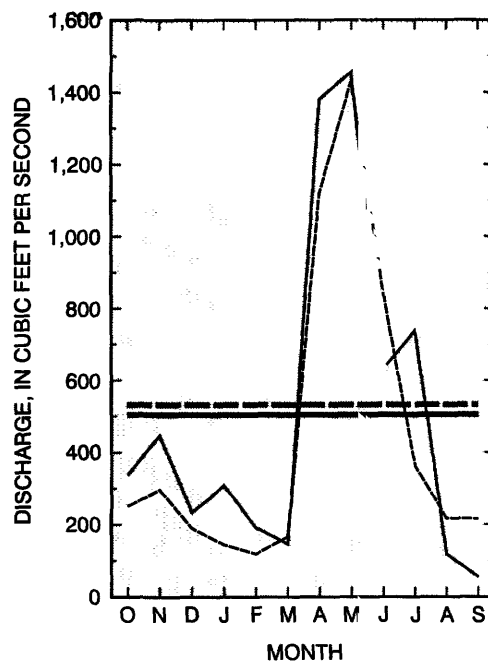


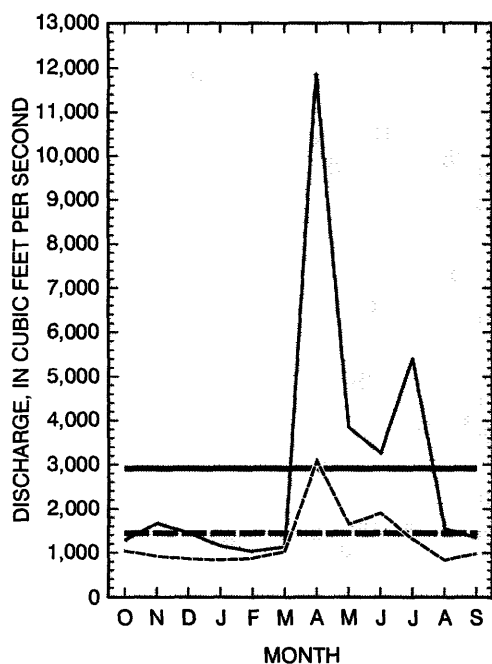
Figure 2.--Average annual precipitation, in inches, for 30-year period, 1961-90, in Minnesota.



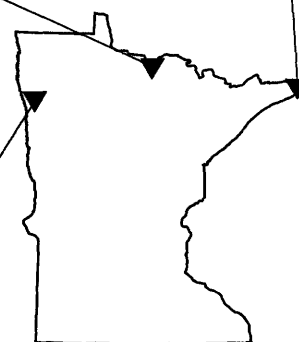
5131500 Little Fork River
at Littlefork
Drainage area 1,730 square miles



4010500 Pigeon River
at Middle Falls, near Grand Portage
Drainage area 600 square miles



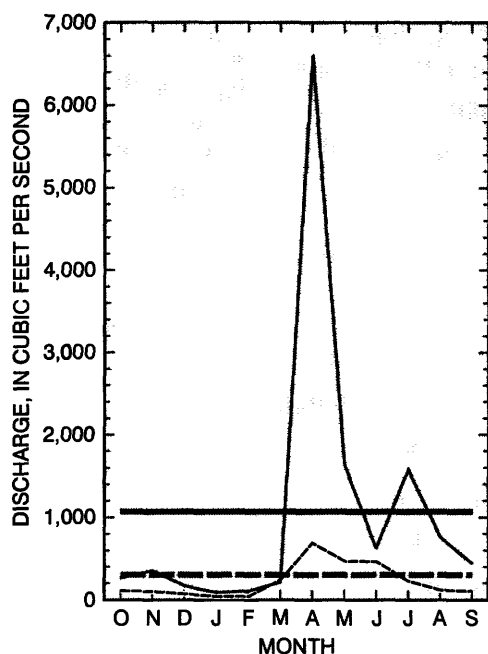
5079000 Red Lake River
at Crookston
Drainage area 5,280 square miles



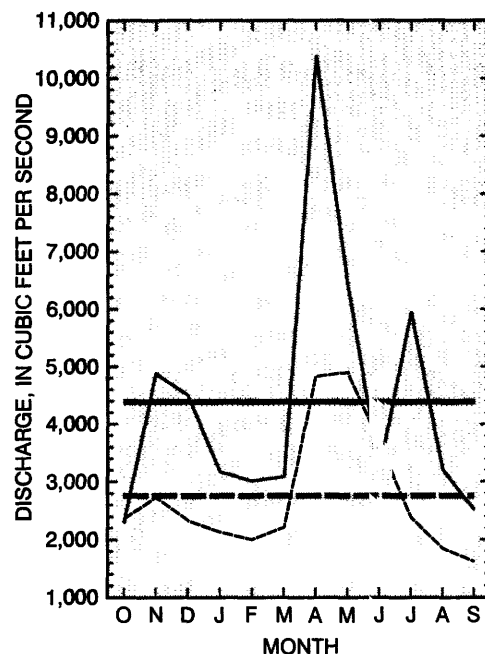
EXPLANATION

- Monthly mean discharge, water year 1997
- - - Median of monthly mean discharge, 1961-1990
- Annual mean discharge, water year 1997
- - - Median of annual mean discharge, 1961-1990

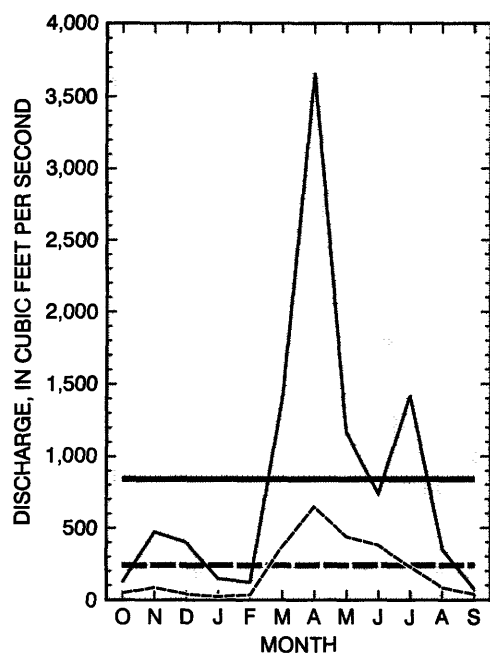
Figure 3.—Comparison of mean discharge for the 1997 water year with the median



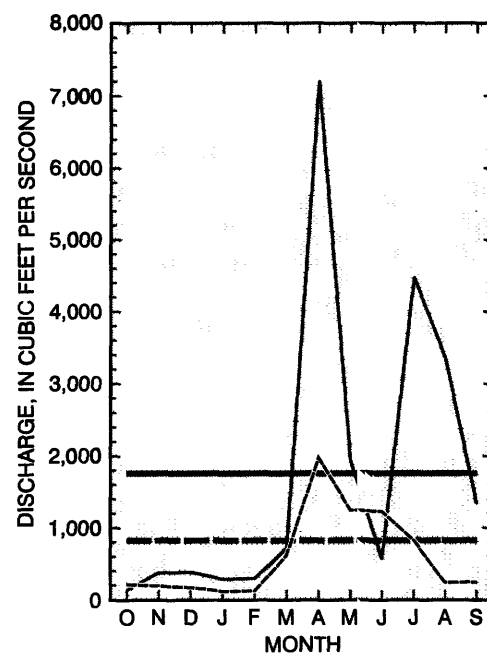
5304500 Chippewa River
near Milan
Drainage area 1,870
square miles



5227500 Mississippi River
at Aitkin
Drainage area 6,140
square miles



5476000 Des Moines River
at Jackson
Drainage area 1,220
square miles



5280000 Crow River
at Rockford
Drainage area 2,520
square miles

of mean discharges for 1961-90 at seven long-term representative gaging stations.

Surface Water

Figure 3 shows monthly-mean and annual-mean discharges for water year 1997 compared to normal (median of monthly-mean discharges for the period 1961-90) for 7 streamflow gaging stations. These stations are located in 4 major basins - Lake Superior, Red River of the North, Lake of the Woods, and the upper Mississippi River. The 1997 annual-mean discharges were greater than the normal medians for all stations except Pigeon River at Middle Falls near Grand Portage.

Monthly-mean discharges in the Pigeon River at Middle Falls near Grand Portage were near normal for most of the 1997 water year except for August and September which were 54 percent and 26 percent of normal, respectively. The annual-mean discharge for 1997 was 505 ft³/s, or 95 percent of normal. Annual runoff was 11.42 inches, a decrease of 3.75 inches from the previous year.

Above normal monthly-mean discharges occurred every month at the Red Lake River at Crookston, which is in the Red River of the North basin. Flows ranged from 124 percent of normal in October to 414 percent of normal in July. Annual runoff for 1997 was 7.51 inches, an increase of 0.92 inches from the previous year. Annual-mean discharge was 2916 ft³/s, which is 202 percent of normal. The instantaneous peak discharge of 28,000 ft³/s was on April 18 and was second highest peak discharge of record.

Monthly-mean discharges for the Little Fork River at Littlefork, which is in the Lake of the Woods basin, began with October being 153 percent of normal and ended with September at 29 percent of normal. Monthly-mean discharges for the entire water year ranged from 391 percent of normal in November to 29 percent of normal in September. Annual-mean discharge for 1997 was 1397 ft³/s, which is 120 percent of normal. Annual runoff for 1997 was 10.96 inches, a decrease of 1.51 inches from the previous year.

Flows in the Mississippi River at Aitkin were above normal except for October and June which were 97 percent and 87 percent of normal. Flows for the month of July was 250 percent of normal. The annual-mean discharge of 4387 ft³/s for 1997 is 150 percent of normal and annual runoff was 9.70 inches or 0.40 inches more than last year.

Flows in the Crow River at Rockford, located about 30 miles west of the Twin Cities in the Mississippi River basin, were near normal the entire year except for April, July, August, and September which were 364 percent, 542 percent, 1420 percent, and 555 percent above normal respectively. The annual-mean discharge of 1762 ft³/s for 1997 is 213 percent of normal.

In the Chippewa River near Milan, monthly-mean flows were near normal for the first six months and above normal the rest of the year. The month with the greatest departure from normal was April with a monthly-mean discharge of 6606 ft³/s, which is 959 percent above normal. April also had the highest instantaneous discharge for the period of record with a discharge of 14,400 ft³/s on April 6. The annual-mean discharge for 1997 was 1068 ft³/s, which is 293 percent of normal.

Flows in the Des Moines River at Jackson in southwest Minnesota were again greater than normal for the entire year. Monthly-mean flows have remained above normal since May of 1991. Flows for November, April, and July were 566 percent, 565 percent, and 622 percent of normal respectively. Monthly-mean discharges ranged from 131 ft³/s for February to 1986 ft³/s for June. The annual-mean discharge of 840 ft³/s for 1997 is 227 percent of normal.

In addition to Red Lake River at Crookston and Chippewa River near Milan, more than 20 other stations recorded either the highest- or second-highest peak discharges for the period of record. These stations include the Bois de Sioux River near Doran with a record discharge of 12,300 ft³/s on April 16, Wild Rice River at Twin Valley with a record discharge of 9300 ft³/s on April 15, and Minnesota River at Montevideo with a record discharge of 47,500 ft³/s, on April 6.

Combined storage in the 6 Mississippi River Headwater Reservoirs (Winnibigoshish, Leech, Pokegama, Pine, Sandy, and Gull), in north-central Minnesota, was 1,523,000 acre-feet at the close of the 1997 water year. This

was a decrease of 60,000 acre-feet from the close of last water year.

Water Quality

Boxplots for 3 U.S. Geological Survey National Water-Quality Assessment (NAWQA) stations are used to depict, to a limited extent, variability in concentrations of dissolved solids and nitrate as nitrogen (figs. 4 and 5).

Boxplots display the central tendency, variation, and skewness of a data set as well as the presence or absence of extreme values. A boxplot consists of a centerline (the median) dividing a rectangle whose ends are defined by the 75th and 25th percentiles. Whiskers extend from the ends of the box to the most extreme observation within 1.5 times the interquartile range (the distance from the 25th to the 75th percentile values) beyond the ends of the box. Values more than 1.5 interquartile ranges from the box ends may indicate extreme hydrologic and chemical conditions or sampling and analytical errors. Observations from 1.5 to 3 interquartile ranges from the box in either direction are plotted individually with a closed circle. Observations greater than 3 interquartile ranges from the ends of the box are plotted with an open circle.

Current water year values are plotted with a triangle to show where these data lie with respect to the distribution of the historic data. These plots represent each sample collected and were collected monthly, or in some cases, two to three times per month.

Dissolved-solids sample concentrations for the Mississippi River near Royalton, Minnesota River near Jordan, and Mississippi River below Lock and Dam 2 at Hastings were collected for the Upper Mississippi River NAWQA (National Water Quality Assessment) program, and are shown in figure 4. In the 1997 water year, monthly-mean concentrations of dissolved-solids for Mississippi River at Royalton were above the historical monthly medians for all months except October, August and September. At the Minnesota River near Jordan, 1997 water-year monthly means were at or below the historical monthly medians for all months except August, while samples taken at Mississippi River at Hastings were significantly above the historical monthly medians for all months except April.

Nitrate concentrations reported as nitrogen (analyzed for nitrate plus nitrite) are shown in figure 5. Sample concentrations in 1997 for the Mississippi River near Royalton ranged from <0.05 mg/L to 0.35 mg/L and were at or below historical monthly medians for all months except July and August. Nitrate concentrations for the Minnesota River near Jordan ranged from 0.13 mg/L in October to 10.3 mg/L in July. Nitrate concentrations for the Mississippi River at Hastings ranged from 0.90 mg/L in May, to 4.98 mg/L in July, which was higher than historical monthly medians for all months except May and June.

Data for 64 ground-water samples - collected in 4 counties - are published in this report. Nitrate concentrations (reported as nitrogen) were determined in all 64 samples and 7 of those concentrations were above the primary drinking-water standard of 10 mg/L (Minnesota Department of Health, 1994). Manganese concentrations were determined in 15 samples, all of which were collected from wells in Hennepin County. Manganese concentrations for all samples were above the manganese standard of 100 ug/L.

Water quality data from one National Atmospheric Deposition Program/National Trends Network site located at Camp Ripley, is available on the internet at:

<http://btdqs.usgs.gov/acidrain>

Ground-Water Levels

The current observation-well network includes 16 wells, of which 14 are equipped with recorders. These wells include three in surficial sand aquifers, one in the St. Peter aquifer, nine in the Prairie du Chien-Jordan aquifer, two in the Franconia-Ironton-Galesville aquifer, and one in the Mount-Simon-Hinckley-Fond du Lac aquifer. Data from these wells are presented in this volume. The location of these wells is shown in figure 10.

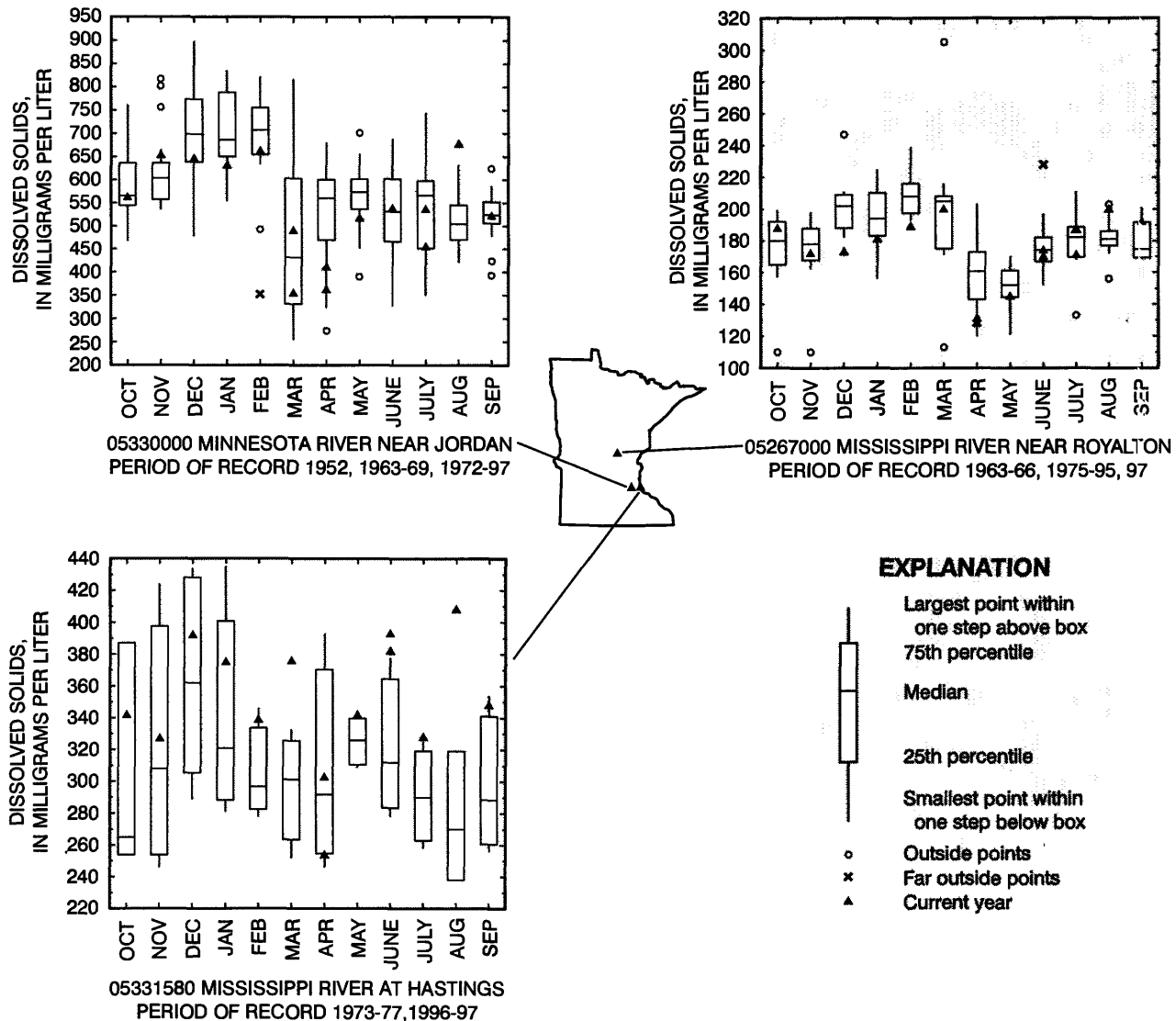


Figure 4. Dissolved solids concentrations in samples collected during water year 1997 and selected statistics for period of record at three network stations.

SPECIAL NETWORKS AND PROGRAMS

Hydrologic Bench-Mark Network is a network of 50 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by human activities.

National Stream-Quality Accounting Network (NASQAN) monitors the water quality of large rivers within four of the Nation's largest river basins—the Mississippi, Columbia, Colorado, and Rio Grande. The network consists of 39 stations. Samples are collected with sufficient frequency that the flux of a wide range of constituents can be estimated. The objective of NASQAN is to characterize the water quality of these large rivers by measuring concentration and mass transport of a wide range of dissolved and suspended constituents, including nutrients, major ions, dissolved and sediment-bound

heavy metals, common pesticides, and inorganic and organic forms of carbon. This information will be used: (1) to describe the long-term trends and changes in concentration and transport of these constituents; (2) to test findings of the National Water-Quality Assessment Program (NAWQA); (3) to characterize processes unique to large-river systems such as storage and re-mobilization of sediments and associated contaminants; and (4) to refine existing estimates of off-continent transport of water, sediment, and chemicals for assessing human effects on the world's oceans and for determining global cycles of carbon, nutrients, and other chemicals.

The National Atmospheric Deposition Program/National Trends Network (NADP/NTN) provides continuous measurement and assessment of the chemical climate of precipitation throughout the United States. As the lead federal agency, the USGS works together with over 100 organizations to accomplish the following objectives: (1) Provide a long-term, spatial and temporal record of atmospheric deposition generated from a network of 191 precipitation chemistry monitoring sites; (2) Provide the mechanism to

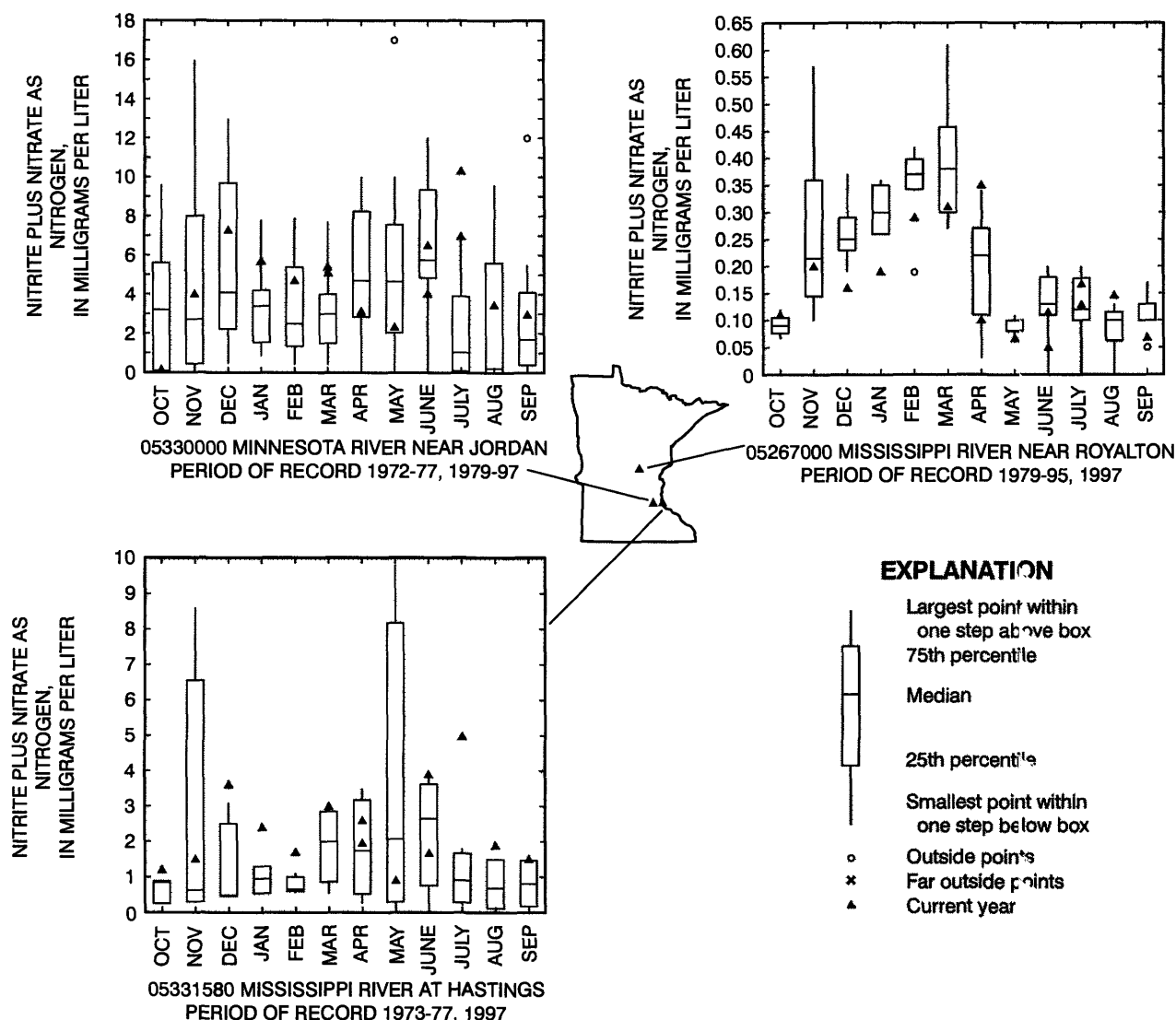


Figure 5. Nitrite plus nitrate concentrations in samples collected during water year 1997 and selected statistics for period of record at three network stations.

evaluate the effectiveness of the significant reduction in SO_2 emissions that began in 1995 as implementation of the Clean Air Act Amendments (CAAA) occurred; (3) Provide the scientific basis and nationwide evaluation mechanism for implementation of the Phase II CAAA emission reductions for SO_2 and NO_2 scheduled to begin in 2000.

Data from the network, as well as information about individual sites, are available through the world wide web at:

<http://nadp.nrel.colostate.edu/NADP>

The National Water-Quality Assessment (NAWQA) Program of the U.S. Geological Survey is a long-term program with goals to describe the status and trends of water-quality conditions for a large, representative part of the Nation's ground- and surface-water resources; provide an improved understanding of the primary natural and human factors affecting these observed conditions and trends; and provide information that supports development and evaluation of management, regulatory, and monitoring

decisions by other agencies.

Assessment activities are being conducted in 53 study units (major watersheds and aquifer systems) that represent a wide range of environmental settings nationwide and that account for a large percentage of the Nation's water use. A wide array of chemical constituents will be measured in groundwater, surface water, streambed sediments, and fish tissues. The coordinated application of comparative hydrologic studies at a wide range of spatial and temporal scales will provide information for decision making by water resources managers and a foundation for aggregation and comparison of findings to address water-quality issues of regional and national interest.

Communication and coordination between USGS personnel and other local, State, and federal interests are critical components of the NAWQA Program. Each study unit has a local liaison committee consisting of representatives from key federal, State, and local water resources agencies, Indian nations, and universities in the study unit. Liaison committees typical

meet semiannually to discuss their information needs, monitoring plans and progress, desired information products, and opportunities to collaborate efforts among the agencies.

Additional information about the NAWQA Program is available through the world wide web at:

http://www.rvares.er.usgs.gov/nawqa/nawqa_home.html

Radiochemical program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Tritium network is a network of stations which has been established to provide baseline information on the occurrence of tritium in the Nation's surface waters. In addition to the surface-water stations in the network, tritium data are also obtained at a number of precipitation stations. The purpose of the precipitation stations is to provide an estimate sufficient for hydrologic studies of the tritium input to the United States.

EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for the 1997 water year that began October 1, 1996, and ended September 30, 1997. A calendar of the water year is provided on the inside of the front cover. The records contain streamflow data, stage and content data for lakes and reservoirs, water-quality data for the surface and ground water, and ground-water-level data. The locations of the stations and wells where the data were collected are shown in figures 7, 8, 9 and 10. The following sections of the introductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

STATION IDENTIFICATION NUMBERS

Each data station, whether stream site or well, in this report is assigned a unique identification number. This number is unique in that it applies specifically to a given station and to no other. The number usually is assigned when a station is first established and is retained for that station indefinitely. The system used by the U.S. Geological Survey to assign identification numbers for surface-water stations and for ground-water well sites differ, but both are based on geographic location. The "downstream order" system is used for regular surface-water stations and the "latitude-longitude" system is used for wells and, in Minnesota, for surface-water stations where only miscellaneous measurements are made.

Downstream Order System and Station Number

Since October 1, 1950, the order of listing hydrologic-station records in U.S. Geological Survey reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a mainstream station are listed before that station. A station on a tributary that enters between two main-stream sections is listed between them. A similar order is followed by listing stations on first rank, second rank, and other order ranks of tributaries. The rank of any tributary on which a station is situated with respect to the stream to which it is immediately tributary is indicated by an indentation in a list of stations in front of the report. Each indentation represents one rank. This downstream order and system of indentation show which stations are on tributaries between any two stations and the rank of the tributary on which each station is situated.

As an added means of identification, each hydrologic station and partial-record station has been assigned a station number. These are in the same downstream order in this report. In assigning station numbers, no distinction is made between partial-record stations and other stations; therefore, the station number for a partial-record station indicates downstream-order position in a list made up of both types of stations. Gaps are left in the series of numbers to allow for new stations that may be established; hence, the numbers are not consecutive. The complete eight-digit number for each station such as 05041000, which appears just to the left of the station name, includes the two-digit part number "05" plus the

six-digit downstream order number "041000."

Numbering System for Wells and Miscellaneous Sites

The eight-digit downstream order station numbers are not assigned to wells and miscellaneous sites where only random water-quality samples or discharge measurements are taken.

The well and miscellaneous site numbering system of the U.S. Geological Survey is based on the grid system of latitude and longitude. The system provides the geographic location of the well or miscellaneous site and a unique number for each site. The number consists of 15 digits. The first six digits denote the degrees, minutes, and seconds of latitude, the next seven digits denote degrees, minutes, and seconds of longitude, and the last two digits (assigned sequentially) identify the wells or other sites within a one-second grid. See figure 6. Each well site is also identified by a local well number which consists of township, range, and section numbers, three letters designating 1/4, 1/4, 1/4 section location, and a two-digit sequential number.

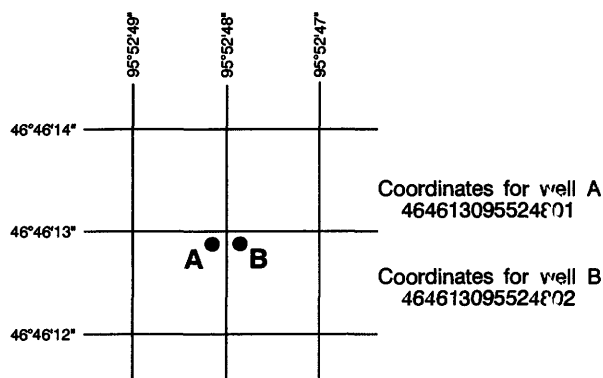


Figure 6.--Example of system for numbering wells and miscellaneous sites.

RECORDS OF STAGE AND WATER DISCHARGE

Records of stage and water discharge may be complete or partial. Complete records of discharge are those obtained using a continuous stage-recording device through which either instantaneous or mean daily discharge may be computed for anytime, or any period of time, during the period of record. Complete records of lake or reservoir content, similarly, are those for which stage or content may be computed or estimated with reasonable accuracy for any time, or period of time. They may be obtained using a continuous stage-recording device, but need not be. Because daily mean discharges and end-of-day contents commonly are published for such stations, they are referred to as "daily stations."

By contrast, partial records are obtained through discrete measurements without using a continuous stage-recording device and pertain only to a few flow characteristics, or perhaps only one. The nature of the partial record is indicated by table titles such as "High-flow partial records," or "Low-flow partial records." Records of miscellaneous discharge measurements or of measurements from special studies, such as low-flow seepage studies, may be considered as partial records, but they are presented separately in this report. Location of all complete-record and high-flow partial-record stations for which data are given in this report are shown in figures 7 and 9.

Data Collection and Computation

The data obtained at a complete-record gaging station on a stream or canal consist of a continuous record of stage, individual measurements of discharge throughout a range of stages, and notations regarding factors that may affect the relationships between stage and discharge. These data, together with supplemental information, such as weather records, are used

to compute daily discharges. The data obtained at a complete-record gaging station on a lake or reservoir consist of a record of stage and of notations regarding factors that may affect the relationship between stage and lake content. These data are used with stage-area and stage-capacity curves or tables to compute water-surface areas and lake storage.

Records of stage are obtained with recorders that trace continuous graphs of stage; or encode stage values at selected time intervals and store on a variety of mediums. Measurements of discharge are made with current meters using methods adapted by the U.S. Geological Survey as a result of experience accumulated since 1880. These methods are described in standard textbooks, in Water-Supply Paper 2175, and in U.S. Geological Survey Techniques of Water-Resources Investigations, Book 3, Chapter A6.

In computing discharge records, results of individual measurements are plotted against the corresponding stages, and stage-discharge relation curves are then constructed. From these curves, rating tables indicating the approximate discharge for any stage within the range of the measurements are prepared. If it is necessary to define extremes of discharge outside the range of current-meter measurements, the curves are extended using: (1) logarithmic-plotting; (2) velocity-area studies; (3) results of indirect measurements of peak discharge, such as slope-area or contracted-opening measurements, and computations of flow-over-dams or weirs; or (4) step-backwater techniques.

Daily-mean discharges are computed by applying the daily-mean stages (gage heights) to the stage-discharge curves or tables. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is determined by the shifting-control method, in which correction factors based on the individual discharge measurements and notes of the personnel making the measurements are applied to the gage heights before the discharges are determined from the curves or tables. This shifting-control method also is used if the stage-discharge relation is changed temporarily because of aquatic growth or debris on the control. For some stations, formation of ice in the winter may so obscure the stage-discharge relations that daily-mean discharges must be estimated from other information such as temperature and precipitation records, notes of observations, and records for other stations in the same or nearby basins for comparable periods.

At some stream-gaging stations the stage-discharge relation is affected by the backwater from reservoirs, tributary streams, or other sources. This necessitates the use of the slope method in which the slope or fall in a reach of the stream is a factor in computing discharge. The slope or fall is obtained by means of an auxiliary gage set at some distance from the base gage. At some stations the stage-discharge relation is affected by changing stage; at these stations the rate of change in stage is used as a factor in computing discharge.

In computing records of lake or reservoir contents, it is necessary to have available from surveys, curves, or tables defining the relationship of stage and content. The application of stage to the stage-content curves or tables gives the contents from which daily, monthly, or yearly changes then are determined. If the stage-content relationship changes because of deposition of sediment in a lake or reservoir, periodic resurveys may be necessary to redefine the relationship. Even when this is done, the contents computed may become increasingly in error as time since the last survey increases. Discharge over lake or reservoir spillways are computed from stage-discharge relationships much as other stream discharges are computed.

For some gaging stations there are periods when no gage-height record is obtained, or the recorded gage height is so faulty that it cannot be used to compute daily discharge or contents. For such periods, the daily discharges are estimated from the recorded range in stage, previous or following record, discharge measurements, weather records, and comparison with other station records from the same or nearby basins. Likewise, daily contents may be estimated from operator's logs, previous or following record, inflow-outflow studies, and other information.

Information explaining how estimated daily-discharge values are identified in station records is included in the next two sections, "Data Presentation" (REMARKS paragraph) and "Identifying Estimated Daily Discharge."

Data Presentation

Streamflow data in this report are presented in a new format that is considerably different from the format in data reports prior to the 1991 water year. The major changes are that statistical characteristics of discharge now appear in tabular summaries following the water-year data table and less information is provided in the text or station manuscript above the table. These changes represent the results of a pilot program to reformat the annual water-data report to meet current user needs and data preferences.

The records published for each continuous-record surface-water discharge station (gaging station) now consist of four parts, the manuscript or station description; the data table of daily mean values of discharge for the current water year with summary data; a tabular statistical summary of monthly mean flow data for a designated period, by water year; and a summary statistics table that includes statistical data of annual, daily and instantaneous flows as well as data pertaining to annual runoff, 7-day low-flow minimums, and flow duration.

Station Manuscript

The manuscript provides, under various headings, descriptive information, such as station location; period of record; historical extremes outside the period of record; record accuracy; and other remarks pertinent to station operation and regulation. The following information, as appropriate, is provided with each continuous record of discharge or lake content. Comments to follow clarify information presented under the various headings of the station description.

LOCATION.--Information on locations is obtained from the most accurate maps available. The location of the gage with respect to the cultural and physical features in the vicinity and with respect to the reference place mentioned in the station name is given. River mileages, given for only a few stations, were determined by methods given in "River Mileage Measurement," Bulletin 14, Revision of October 1968, prepared by the Water Resources Council or were provided by the U.S. Army Corps of Engineers.

DRAINAGE AREA.--Drainage areas are measured using the most accurate maps available. Because the type of maps available varies from one drainage basin to another, the accuracy of drainage areas likewise varies. Drainage areas are updated as better maps become available.

PERIOD OF RECORD.--This indicates the period for which there are published records for the station or for an equivalent station. An equivalent station is one that was in operation at a time when the present station was not, and whose location was such that records from it can reasonably be considered equivalent with records from the present station.

REVISED RECORDS.--Published records because of new information, occasionally are found to be incorrect, and revisions are printed in later reports. Listed under this heading are all reports in which revisions have been published for the station and water years to which the revisions apply. If a revision did not include daily, monthly, or annual figures of discharge, that fact is noted after the year dates as follows: "(M)" means that only the instantaneous maximum discharge was revised; "(m)" means that only the instantaneous minimum was revised; and "(P)" means that only peak discharges were revised. If the drainage area has been revised, the report in which the most recently revised figure was first published is given.

GAGE.--The type of gage in current use, the datum of the current gage referred to National Geodetic Vertical Datum of 1929 (see glossary), and a condensed history of the types, locations, and datum of previous gages are given under this heading.

REMARKS.--All periods of estimated daily-discharge record will

either be identified by date in this paragraph of the station description for water-discharge stations or flagged in the daily-discharge table. If a remarks statement is used to identify estimated record, the paragraph will begin with this information presented as the first entry. The paragraph is also used to present information relative to the accuracy of the records, to special methods of computation, to conditions that affect natural flow at the station and, possibly, to other pertinent items. For reservoir stations, information is given on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir.

COOPERATION.--Records provided by a cooperating organization or obtained for the U.S. Geological Survey by a cooperating organization are identified here.

EXTREMES OUTSIDE PERIOD OF RECORD.--Included here is the information concerning major floods or unusually low flows that occurred outside the stated period of record. The information may or may not have been obtained by the U.S. Geological Survey.

REVISIONS.--If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because, for these stations, there would be no current or, possibly, future station manuscript published to document the revision in a "Revised Records" entry, users of data for these stations who obtained the record from previously published data reports may wish to contact the Minnesota District office (address given on the back of title page of this report) to determine if the published records were ever revised after the station was discontinued. Of course, if the data were obtained by computer retrieval, the data would be current and there would be no need to check because any published revision of data is always accompanied by revision of the corresponding data in computer storage.

Manuscript information for lake or reservoir stations differs from that for stream stations in the nature of the "Remarks" and to the inclusion of a skeleton stage-capacity table when daily contents are given.

Headings for AVERAGE DISCHARGE, EXTREMES FOR PERIOD OF RECORD, AND EXTREMES FOR CURRENT YEAR have been deleted and the information contained in these paragraphs, except for the listing of secondary instantaneous peak discharges in the EXTREMES FOR CURRENT YEAR paragraph, is now presented in the tabular summaries following the discharge table or in the REMARKS paragraph, as appropriate. No changes have been made to the data presentations of lake contents.

Data Table of Daily-mean Values

The daily table of discharge records for stream-gaging stations gives mean discharge for each day of the water year. In the monthly summary for the table, the line headed "TOTAL" gives the sum of the daily figures for each month; the line headed "MEAN" gives the average flow in cubic feet per second for the month; and the lines headed "MAX" and "MIN" give the maximum and minimum daily mean discharges, respectively, for each month. Discharge for the month also is usually expressed in cubic feet per second per square mile (line headed "CFSM"); or in inches (line headed "IN"); or in acre-feet (line headed "AC-FT). Figures for cubic feet per second per square mile and runoff in inches or in acre-feet may be omitted if there is extensive regulation or diversion or if the drainage area includes large noncontributing areas. At some stations monthly and (or) yearly observed discharges are adjusted for reservoir storage or diversion, or diversion data or reservoir contents are given. These figures are identified by a symbol and corresponding footnote.

Statistics of Monthly Mean Data

A tabular summary of the mean (line headed "MEAN"), maximum (line headed "MAX"), and minimum (line headed "MIN") of monthly mean flows for each month for a designated period is provided below the mean values table. The water years of the first occurrence of

the maximum and minimum monthly flows are provided immediately below those figures. The designated period will be expressed as "FOR WATER YEARS 19__-19__, BY WATER YEAR (WY)," and will list the first and last water years of the range of years selected from the PERIOD OF RECORD paragraph in the station manuscript. It will consist of all of the station record within the specified water years, inclusive, including complete months of record for partial water years, if any, and may coincide with the period of record for the station. The water years for which the statistics are computed will be consecutive, unless a break in the station record is indicated in the manuscript.

Summary Statistics

A table titled "SUMMARY STATISTICS" follows the statistics of monthly mean data tabulation. This table consists of four columns, with the first column containing the line headings of the statistics being reported. The table provides a statistical summary of yearly, daily, and instantaneous flows, not only for the current water year but also for the previous calendar year and for a designated period, as appropriate. The designated period selected, "WATER YEARS 19__-19__," will consist of all of the station record within the specified water years, inclusive, including complete months of record for partial water years, if any, and may coincide with the period of record for the station. The water years for which the statistics are computed will be consecutive, unless a break in the station record is indicated in the manuscript. All of the calculations for the statistical characteristics designated ANNUAL (see line headings below), except for the ANNUAL 7-DAY MINIMUM statistic, are calculated for the designated period using complete water years. The other statistical characteristics may be calculated using partial water years.

The date or water year, as appropriate, of the first occurrence of each statistic reporting extreme values of discharge is provided adjacent to the statistic. Repeated occurrences may be noted in the REMARKS paragraph of the manuscript or in footnotes. Because the designated period may not be the same as the station period of record published in the manuscript, occasionally the dates of occurrence listed for the daily and instantaneous extremes in the designated-period column may not be within the selected water years listed in the heading. When this occurs, it will be noted in the REMARKS paragraph or in footnotes. Selected streamflow duration curve statistics and runoff data are also given. Runoff data may be omitted if there is extensive regulation or diversion of flow in the drainage basin.

The following summary statistics data, as appropriate, are provided with each continuous record of discharge. Comments to follow clarify information presented under the various line headings of the summary statistics table.

ANNUAL TOTAL.--The sum of the daily-mean values of discharge for the year. At some stations the yearly-mean discharge is adjusted for reservoir storage or diversion. The adjusted figures are identified by symbol and corresponding footnotes.

ANNUAL MEAN.--The arithmetic mean of the individual daily mean discharges for the year noted or for the designated period. At some stations the yearly-mean discharge is adjusted for reservoir storage or diversion. The adjusted figures are identified by a symbol and corresponding footnotes.

HIGHEST ANNUAL MEAN.--The maximum annual mean discharge occurring for the designated period.

LOWEST ANNUAL MEAN.--The minimum annual mean discharge occurring for the designated period.

HIGHEST DAILY MEAN.--The maximum daily mean discharge for the year or for the designated period.

LOWEST DAILY MEAN.--The minimum daily mean discharge for the year or for the designated period.

ANNUAL 7-DAY MINIMUM.--The lowest mean discharge for 7 consecutive days for a calendar year or a water year. Note that most

low-flow frequency analyses of annual 7-day minimum flows use a climatic year (April 1-March 31). The date shown in the summary statistics table is the initial date of the 7-day period. (This value should not be confused with the 7-day 10-year low-flow statistic.)

INSTANTANEOUS PEAK FLOW.--The maximum instantaneous discharge occurring for the water year or for the designated period. Note that secondary instantaneous peak discharges above a selected base discharge are stored in Minnesota District computer files for stations meeting certain criteria. Those discharge values may be obtained by writing to the Minnesota District Office. (See address on back of title page of this report.)

INSTANTANEOUS PEAK STAGE.--The maximum instantaneous stage occurring for the water year or for the designated period. If the dates of occurrence for the instantaneous peak flow and instantaneous peak stage differ, the REMARKS paragraph in the manuscript or a footnote may be used to provide further information.

INSTANTANEOUS LOW FLOW.--The minimum instantaneous discharge occurring for the water year or for the designated period.

ANNUAL RUNOFF --Indicates the total quantity of water in runoff for a drainage area for the year. Data reports may use any of the following units of measurement in presenting annual runoff data.

Acre-foot (AC-FT) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Cubic feet per second per square mile (CFSM) is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming the runoff is distributed uniformly in time and area.

Inches (INCHES) indicates the depth to which the drainage area would be covered if all of the runoff for a given time period were uniformly distributed on it.

10 PERCENT EXCEEDS.--The discharge that is exceeded by 10 percent of the flow for the designated period.

50 PERCENT EXCEEDS.--The discharge that is exceeded by 50 percent of the flow for the designated period.

90 PERCENT EXCEEDS.--The discharge that is exceeded by 90 percent of the flow for the designated period.

Data collected at partial-record stations follow the information for continuous-record sites. Data for partial-record discharge stations are presented in two tables. The first is a table of discharge measurements at low-flow partial-record stations, and the second is a table of annual maximum stage and discharge at crest-stage stations. The tables of partial-record stations are followed by a listing of discharge measurements made at sites other than continuous-record or partial-record stations. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Identifying Estimated Daily Discharge

Estimated daily-discharge values published in the water-discharge tables of annual State data reports are identified either by flagging individual daily values with the letter symbol "e" and printing a table footnote, "e Estimated", or by listing the dates of the estimated record in the REMARKS paragraph of the station description.

Accuracy of the Records

The accuracy of streamflow records depends primarily on: (1) The stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements; and (2) the accuracy of

measurements of stage, measurements of discharge, and interpretation of records.

The accuracy attributed to the records is indicated under "REMARKS." "Excellent" means that about 95 percent of the daily discharges are within 5 percent of the true; "good," within 10 percent; and "fair," within 15 percent. Records that do not meet the criteria mentioned, are rated "poor." Different accuracies may be attributed to different parts of a given record.

Daily mean discharges in this report are given to the nearest hundredth of a cubic foot per second for values less than 1 ft³/s; to the nearest tenth between 1.0 and 10 ft³/s; to whole numbers between 10 and 1000 ft³/s; and to 3 significant figures for more than 1000 ft³/s. The number of significant figures used is based solely on the magnitude of the discharge value. The same rounding rules apply to discharges listed for partial-record stations and miscellaneous sites.

Discharge at many stations, as indicated by the monthly mean, may not reflect natural runoff due to the effects of diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or to other factors. For such stations, figures of cubic feet per second per square mile and of runoff, in inches, are not published unless satisfactory adjustments can be made for diversions, for changes in contents of reservoirs, or for other changes incident to use and control. Evaporation from a reservoir is not included in the adjustments for changes in reservoir contents, unless it is so stated. Even at those stations where adjustments are made, large errors in computed runoff may occur if adjustments or losses are large in comparison with the observed discharge.

Other Records Available

Information of a more detailed nature than that published for most of the gaging stations such as observations of water temperatures, discharge measurements, gage-height records, and rating tables is on file in the Minnesota District office. Also most gaging-station records are available in computer-usable form and many statistical analyses have been made.

Information on the availability of unpublished data or statistical analyses may be obtained from the district office.

The National Water Data Exchange, Water Resources Division, U.S. Geological Survey, National Center, Reston VA 22092, maintains an index of all discharge-measurement sites in the State as well as an index of records of discharge collected by other agencies but not published by the U.S. Geological Survey. Information on records available at specific sites can be obtained upon request.

RECORDS OF SURFACE-WATER QUALITY

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because interpretation of records of surface-water quality nearly always requires corresponding discharge data. Records of surface-water quality in this report may involve a variety of types of data and measurement frequencies.

Classification of Records

Water-quality data for surface-water sites are grouped into one of three classifications. A **continuing record station** is a site where data are collected on a regularly scheduled basis. Frequency may be once or more times daily, weekly, monthly, or quarterly. A **partial-record station** is a site where limited water-quality data are collected systematically over a period of years. Frequency of sampling is usually less than quarterly. A **miscellaneous sampling site** is a location other than a continuing or partial-record station, where random samples are collected to give better areal coverage to define water-quality conditions in the river basin.

A distinction needs to be made between "continuing records" as used in this report and "continuous recordings," which refers to a continuous graph or a series of discrete values punched at short intervals on a paper tape. Some records of water quality, such as temperature and specific

conductance, may be obtained through continuous recordings; however, because of costs, most data are obtained only monthly or less frequently. Locations of stations for which records on the quality of surface water appear in this report are shown in figure 9.

Arrangement of Records

Water-quality records collected at a surface-water daily record station are published immediately following that record, regardless of the frequency of sample collection. Station number and name are the same for both records. Where a surface-water daily record station is not available or where the water quality differs significantly from that at the nearby surface-water station, the continuing water-quality record is published with its own station number and name in the regular downstream-order sequence. Water-quality data for partial-record stations and for miscellaneous sampling sites appear in separate tables following the table of discharge measurements at miscellaneous sites.

On-Site Measurement and Sample Collection

Water quality data must be representative of the in situ quality of water. To assure this, certain measurements, such as water temperature, pH, and dissolved oxygen need to be made onsite when the samples are taken. To assure that measurements made in the laboratory also represent the in situ water, carefully prescribed procedures need to be followed in collecting the samples, in treating the samples to prevent changes in quality pending analysis, and in shipping the samples to the laboratory. Procedures for on-site measurements and for collecting, treating, and shipping samples are given in publications on "Techniques of Water-Resources Investigations," Book 1, Chap. D2; Book 3, Chap. C2; Book 5 Chap. A1, A3, and A4. All of these references are listed on pages 22 and 23 of this report. Also, detailed information on collecting, treating, and shipping samples may be obtained from the Geological Survey Minnesota District office.

One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross section is homogeneous. However, the concentration of solutes at different locations in the cross section may vary widely with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Some streams must be sampled through several vertical sections to obtain a representative sample needed for an accurate mean concentration and for use in calculating load. All samples obtained for the National Stream Quality Accounting Network (see definitions) are obtained from at least several verticals. Whether samples are obtained from the centroid of flow or from several verticals, depends on flow conditions and other factors which must be evaluated by the collector.

Chemical-quality data published in this report are considered to be the most representative values available for the stations listed. The values reported represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. In the rare case where an apparent inconsistency exists between a reported pH value and the relative abundance of carbon dioxide species (carbonate and bicarbonate), the inconsistency is the result of a slight uptake of carbon dioxide from the air by the sample between measurement of pH in the field and determination of carbonate and bicarbonate in the laboratory.

For chemical-quality stations equipped with digital monitors, the records consist of daily maximum, minimum, and mean values for each constituent measured and are based upon hourly punches beginning at 0100 hours and ending at 2400 hours for the day of record. More detailed records (hourly values) may be obtained from the U.S. Geological Survey Minnesota District office whose address is given on the back of the title page of this report.

Water Temperature

Water temperatures are measured at most of the water-quality stations. In addition, water temperatures are taken at time of discharge

measurements for water-discharge stations. For stations where water temperatures are taken manually once or twice daily, the water temperatures are taken at about the same time each day. Large streams have a small diurnal temperature change; shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. Some streams may be affected by waste-heat discharges.

At stations where recording instruments are used, either mean temperatures or maximum and minimum temperatures for each day are published. Water temperatures measured at the time of water-discharge measurements are on file in the Minnesota District office.

Sediment

Suspended-sediment concentrations are determined from samples collected by using depth-integrating samplers. Samples usually are obtained at several verticals in the cross section, or a single sample may be obtained at a fixed point and a coefficient applied to determine the mean concentration in the cross sections.

During periods of rapidly changing flow or rapidly changing concentration, samples may have been collected more frequently (twice daily or, in some instances, hourly). The published sediment discharges for days of rapidly changing flow or concentration were computed by the subdivided-day method (time-discharge weighted average). Therefore, for those days when the published sediment discharge value differs from the value computed as the product of discharge times mean concentration times 0.0027, the reader can assume that the sediment discharge for that day was computed by the subdivided-day method. For periods when no samples were collected, daily loads of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately before and after the periods, and suspended-sediment loads for other periods of similar discharge.

At other stations, suspended-sediment samples were collected periodically at many verticals in the stream cross section. Although data collected periodically may represent conditions only at the time of observations, such data are useful in establishing seasonal relations between quality and streamflow and in predicting long-term sediment-discharge characteristics of the stream.

In addition to the records of suspended-sediment discharge, records of the periodic measurements of the particle-size distribution of the suspended sediment and bed material are included for some stations.

Laboratory Measurements

Samples for indicator bacteria and specific conductance are analyzed locally. All other samples are analyzed in the Geological Survey laboratories in Arvada, Colo., Doraville, Ga., or Iowa City, Ia. Methods used in analyzing sediment samples and computing sediment records are given in Transactions of Water Resources Investigations (TWRI), Book 5, Chap. C1. Methods used by the U.S. Geological Survey laboratories are given in TWRI, Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4.

Data Presentation

For continuing-record stations, information pertinent to the history of station operation is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, drainage area, period of record, type of data available, instrumentation, general remarks, cooperation, and extremes for parameters currently measured daily. Tables of chemical, physical, biological, radiochemical data, and so forth, obtained at a frequency less than daily are presented first. Tables of "daily values" of specific conductance, pH, water temperature, dissolved, and suspended sediment then follow in sequence.

In the descriptive headings, if the location is identical to that of the discharge gaging station, neither the LOCATION nor the DRAINAGE AREA statements are repeated. The following information, when appropriate, is provided with each continuous-record station. Comments that follow clarify information presented under the various headings of the station

description.

LOCATION.--See Data Presentation under "Records of stage and Water Discharge"; same comments apply.

DRAINAGE AREA.--See Data Presentation under "Records of stage and Water Discharge"; same comments apply.

PERIOD OF RECORD.--This indicates the periods for which there are published water-quality records for the station. The periods are shown separately for records of parameters measured daily or continuously and those measured less than daily. For those measured daily or continuously, periods of record are given for the parameters individually.

INSTRUMENTATION.--Information on instrumentation is given only if a water-quality monitor, temperature recorder, sediment pumping sampler, or other sampling device is in operation at a station.

REMARKS.--Remarks provide added information pertinent to the collection, analysis, or computation of the records.

COOPERATION.--Records provided by a cooperating organization or obtained for the U.S. Geological Survey by a cooperating organization are identified here.

EXTREMES.--Maximums and minimums are given only for parameters measured daily or more frequently. None are given for parameters measured weekly or less frequently, because the true maximums or minimums may not have been sampled. Extremes, when given, are provided for both the period of record and for the current water year.

REVISIONS.--If errors in published water-quality records are discovered after publication, appropriate updates are made to the Water-Quality File in the U.S. Geological Survey's computerized data system, WATSTORE, and subsequently by monthly transfer of update transactions to the U.S. Environmental Protection Agency's STORET system. Because the usual volume of updates makes it impractical to document individual changes in the State data-report series or elsewhere, potential users of U.S. Geological Survey water-quality data are encouraged to obtain all required data from the appropriate computer file to insure the most recent updates.

The surface-water-quality records for partial-record stations and miscellaneous sampling sites are published in separate tables following the table of discharge measurements at miscellaneous sites. No descriptive statements are given for these records. Each station is published with its own station number and name in the regular downstream-order sequence.

Remark Codes

The following remark codes may appear with the water-quality data in this report:

<u>PRINTED OUTPUT</u>	<u>REMARK</u>
E	Estimated value
>	Actual value is known to be greater than the value shown.
<	Actual value is known to be less than the value shown
K	Results based on colony count outside the acceptance range (non-ideal colony count)
L	Biological organisms count less than 0.5 percent (organisms may be observed rather than counted)
D	Biological organism count equal to or greater than 15 percent (dominant)
&	Biological organism estimated as dominant

V

Analyte was detected in both the environmental sample and the associated blanks.

Water Quality-Control Data

Data generated from quality-control (QC) samples are a requisite for evaluating the quality of the sampling and processing techniques as well as data from the actual samples themselves. Without QC data, environmental sample data cannot be adequately interpreted because the errors associated with the sample data are unknown. The various types of QC samples collected by this district are described in the following section. Procedures have been established for the storage of water-quality-control data within the USGS. These procedures allow for storage of all derived QC data and are identified so that they can be related to corresponding environmental samples.

Blank Samples

Blank samples are collected and analyzed to ensure that environmental samples have not been contaminated by the overall data-collection process. The blank solution used to develop specific types of blank samples is a solution that is free of the analytes of interest. Any measured value signal in a blank sample for an analyte (a specific component measured in a chemical analysis) that was absent in the blank solution is believed to be due to contamination. There are many types of blank samples possible, each designed to segregate a different part of the overall data-collection process. The types of blank samples collected in this district are:

FIELD BLANK - a blank solution that is subjected to all aspects of sample collection, field processing preservation, transportation, and laboratory handling as an environmental sample.

TRIP BLANK - a blank solution that is put in the same type of bottle used for an environmental sample and kept with the set of sample bottles before and after sample collection.

EQUIPMENT BLANK - a blank solution that is processed through all equipment used for collecting and processing an environmental sample (similar to a field blank but normally done in the more controlled conditions of the office).

SAMPLER BLANK - a blank solution that is poured or pumped through the same field sampler used for collecting an environmental sample.

FILTER BLANK - a blank solution that is filtered in the same manner and through the same filter apparatus used for an environmental sample.

SPLITTER BLANK - a blank solution that is mixed and separated using a field splitter in the same manner and through the same apparatus used for an environmental sample.

PRESERVATION BLANK - a blank solution that is treated with the sampler preservatives used for an environmental sample.

Reference Samples

Reference material is a solution or material prepared by a laboratory whose composition is certified for one or more properties so that it can be used to assess a measurement method. Samples of reference material are submitted for analysis to ensure that an analytical method is accurate for the known properties of the reference material. Generally, the selected reference material properties are similar to the environmental sample properties.

Replicate Samples

Replicate samples are a set of environmental samples collected in a manner such that the samples are thought to be essentially identical in composition. Replicate is the general case for which a duplicate is the special case consisting of two samples. Replicate samples are collected and analyzed to establish the amount of variability in the data contributed by some part of the collection and analytical process. There are many types of replicate samples possible, each of which may yield slightly different results in a dynamic hydrologic setting, such as a flowing stream. The types of replicate samples collected in this district are: Sequential samples - a type of replicate sample in which the samples are collected one after the other, typically over a

short time.

SPLIT SAMPLE - a type of replicate sample in which a sample is split into subsamples contemporaneous in time and space.

Spike Samples

Spike samples are samples to which known quantities of a solution with one or more well-established analyte concentrations have been added. These samples are analyzed to determine the extent of matrix interference or degradation on the analyte concentration during sample processing and analysis.

Dissolved Trace-Element Concentrations

Traditionally, dissolved trace-element concentrations have been reported at the microgram per liter ($\mu\text{g/L}$) level. Recent evidence, mostly from large rivers, indicates that actual dissolved-phase concentrations for a number of trace elements are within the range of 10's and 100's of nanograms per liter (ng/L). Data above the $\mu\text{g/L}$ level should be used with caution. Such data may actually represent elevated environmental concentrations from natural or human causes; however, these data could reflect contamination introduced during sampling, processing, or analysis. To confidently produce dissolved trace-element data with insignificant contamination, the U.S. Geological Survey began using new trace-element protocols at some stations in water year 1994.

Changes in National Trends Network Procedures

Sample handling procedures at all National Trends Network stations were changed substantially on January 11, 1994, in order to reduce contamination from the sample shipping container. The data for samples before and after that date are different and not be comparable. A tabular summary of the differences based on a special intercomparison study, is available from the NADP/NTN Coordination Office, Colorado State University, Fort Collins, CO 80523 (Telephone: 303-491-5643).

RECORDS OF GROUND-WATER LEVELS

Only water-level data from a national network of observation wells are given in this report. These data are intended to provide a sampling and historical record of water-level changes in the Nation's most important aquifers. Locations of the observation wells in this network in Minnesota are shown in figure 10.

Although, in this report, records of water levels are presented for fewer than 20 wells, records are obtained through cooperative efforts of many Federal, State, and local agencies for several hundred observation wells throughout Minnesota and are placed in computer storage. Each spring, the Minnesota Department of Natural Resources, Division of Waters publishes a report for the previous water year entitled "Observation Well Data Summary, Water Year 19__." This report contains hydrographs of recorder wells, detailed maps showing the location of active observation wells, and other useful items. Information about the availability of the data in the water-level file may be obtained from the District Chief, Minnesota District. (See address on back of front page).

Data Collection and Computation

Measurements of water levels are made in many types of wells under varying conditions, but the methods of measurement are standardized to the extent possible. The equipment and measuring techniques used at each observation well assure that measurements at each well are of consistent accuracy and reliability.

Tables of water-level data are presented by counties arranged in alphabetical order. The prime identification number for a given well is the 15-digit number that appears in the upper left corner of the table. The secondary identification number is the local well number, an alphanumeric number, derived from the township-range location of the well.

Water-level records are obtained from direct measurements with a steel tape or from the graph or punched tape of a water-stage recorder. The

water-level measurements in this report are given in feet with reference to land-surface datum (lsd). Land-surface datum is a datum plane that is approximately at land surface at each well. If known, the elevation of the land-surface datum is given in the well description. The height of the measuring point (MP) above or below land-surface datum is given in each well description. Water levels in wells equipped with recording gages are reported for every fifth day and the end of each month (eom).

All water-level measurements are reported to the nearest hundredth of a foot. The error of water-level measurements is normally only a hundredth or a few hundredths of a foot.

Hydrographs showing water-level fluctuations are included for all of the representative wells in both the surficial-sand and bedrock aquifers.

Data Presentation

Each well record consists of two parts, the station description and the data table of water levels observed during the water year. In addition a graph of water levels for the current year or other selected period is included for several representative wells. The description of the well is presented first through use of descriptive headings preceding the tabular data. The comments to follow clarify information presented under the various headings

LOCATION.--This paragraph follows the well-identification number and reports the latitude and longitude (given in degrees, minutes and seconds); a landline-location designation; the hydrologic-unit number; the distance and direction from a geographic point of reference; and the owner's name.

AQUIFER.-- This entry designates by name (if a name exists) and geologic age the aquifer(s) open to the well.

WELL CHARACTERISTICS.--This entry describes the well in terms of depth, diameter, casing depth and/or screened interval, method of construction, use, and includes additional information such as casing breaks, collapsed screen, and other changes since construction.

INSTRUMENTATION.--This paragraph provides information on both the frequency of measurement and the collection method used, allowing the user to better evaluate the reported water-level extremes by knowing whether they are based on weekly, monthly, or some other frequency of measurement.

DATUM.--This entry describes both the measuring point and the land-surface elevation at the well. The measuring point is described physically (such as top of collar, notch in the top of casing, plug in pump base and so on), and in relation to land surface (such as 1.3 ft above land-surface datum). The elevation of the land-surface datum is described in feet above (or below) sea level; it is reported with a precision depending on the method of determination.

REMARKS.--This entry describes factors that may influence the water level in a well or the measurement of the water level. It should identify wells that are also water-quality observation wells, and may be used to acknowledge the assistance of local (non-U.S. Geological Survey) observers.

PERIOD OF RECORD.--This entry indicates the period for which there are published records for the well. It reports the month and year of the start of the publication of water-level records by the U.S. Geological Survey and the words "to current year" if the records are to be continued into the following year. Periods for which water-level records are available, but are not published by the U.S. Geological Survey, may be noted.

EXTREMES FOR THE PERIOD OF RECORD.--This entry contains the highest and lowest water levels of the period of published record, with respect to land-surface datum, and the dates of their occurrence.

A table of water levels follows the station description for each well. Water levels are reported in feet below land-surface datum and all taped measurements of water level are listed. For wells equipped with recorders, abbreviated tables are published; generally, only water-level lows are listed for every fifth day and at the end of the month (eom). The highest and lowest water levels of the water year and their dates of occurrence are shown on

a line below the abbreviated table. Because all values are not published for wells with recorders, the extremes may be values that are not listed in the table. Missing records are indicated by dashes in place of the water level. A hydrograph for a selected period of record follows the water-level table for several representative wells.

RECORDS OF GROUND-WATER QUALITY

Records of ground-water quality in this report differ from other types of records in that for most sampling sites they consist of only one set of measurements for the water year. The quality of ground water ordinarily changes only slowly; therefore, for most general purposes one annual sampling, or only a few samples taken at infrequent intervals during the year, is sufficient. Frequent measurement of the same constituents is not necessary unless one is concerned with a particular problem, such as monitoring for trends in nitrate concentration. In the special cases where the quality of ground water may change more rapidly, more frequent measurements are made to identify the nature of the changes.

Data Collection and Computation

The records of ground-water quality in this report were obtained mostly as a part of special studies in specific areas. Consequently, a number of chemical analyses are presented for some counties but none are presented for others. As a result, the records for this year, by themselves, do not provide a balanced view of ground-water quality statewide. Such a view can be attained only by considering records for this year in context with similar records obtained for these and other counties in earlier years.

Most methods for collecting and analyzing water samples are described in the "U.S. Geological Survey Techniques of Water-Resources Investigation" manuals listed on a following page. The values reported in this report represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. All samples were obtained by trained personnel. The wells sampled were pumped long enough to assure that the water collected came directly from the aquifer and had not stood for a long time in the well casing where it would have been exposed to the atmosphere and to the material, possibly metal, comprising the casings.

Data Presentation

The records of ground-water quality are published in the section titled QUALITY OF GROUND WATER, immediately following the ground-water-level records. Data for quality of ground water are listed alphabetically by County, and are identified by well number. The prime identification number for wells sampled is the 15-digit number derived from the latitude-longitude locations. No descriptive statements are given for ground-water-quality records; however, the well number, depth of well, date of sampling, and other pertinent data are given in the table containing the chemical analyses of the ground water. The REMARK codes listed for surface-water-quality records also are applicable to ground-water-quality records.

ACCESS TO USGS WATER DATA

The USGS provides near real-time stage and discharge data for many of the gaging stations (equipped with the necessary telemetry) and historic daily-mean and peak-flow discharge data for most current and discontinued gaging stations through the world wide web (WWW). These data may be accessed at:

<http://www.water.usgs.gov>

Some water-quality and ground-water data also are available through the WWW. In addition, data can be provided in various machine-readable formats on magnetic tape or 3-1/2 inch floppy disk. Information about the availability of specific types of data or products, and user charges, can be obtained locally from each of the Water Resources Division District Offices (see address on the back of the title page of this report).

DEFINITION OF TERMS

Terms related to streamflow, water-quality, and other hydrologic

data, as used in this report, are defined below. See also table for converting inch-pound units to International System of units (SI) on the inside of back cover.

Acre-foot (AC-FT, acre-ft) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Adenosine triphosphate (ATP) is the primary energy donor in cellular life process. Its central role in living cells makes it an excellent indicator of the presence of living material in water. A measure of ATP, therefore, provides a sensitive and rapid estimate of biomass. ATP is reported in micrograms per liter of the original water sample.

Algae are mostly aquatic single-celled, colonial, or multi-celled plants, containing chlorophyll and lacking roots, stems, and leaves.

Algal growth potential (AGP) is the maximum algal dry weight biomass that can be produced in a natural water sample under standardized laboratory conditions. The growth potential is the algal biomass present at stationary phase and is expressed as milligrams dry weight of algae produced per liter of sample.

Aquifer is a geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Artesian means confined and is used to describe a well in which the water level stands above the top of the aquifer tapped by the well. A flowing artesian well is one in which the water level is above the land surface.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

Total coliform bacteria are a particular group of bacteria that are used as indicators of possible sewage pollution. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria which ferment lactose with gas formation within 48 hours at 35°C. In the laboratory these bacteria are defined as the organisms which produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35°C ± 1.0°C on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal coliform bacteria are bacteria that are present in the intestine or feces of warmblooded animals. They are often used as indicators of the sanitary quality of the water. In the laboratory they are defined as all organisms which produce blue colonies within 24 hours when incubated at 44.5°C ± 0.2°C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal streptococcal bacteria are bacteria also found in the intestine of warmblooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which produce red or pink colonies within 48 hours at 35°C ± 1.0°C on M-FS medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Bed material is the unconsolidated material of which a streambed, lake, pond, reservoir, or estuary bottom is composed.

Biochemical oxygen demand (BOD) is a measure of the quantity of dissolved oxygen, in milligrams per liter, necessary for the decomposition of organic matter by microorganisms, such as bacteria.

Biomass is the amount of living matter present at any given time, expressed as the mass per unit area or volume of habitat.

Ash mass is the mass or amount of residue present after the residue from the dry mass determination has been ashed in a muffle furnace at a temperature of 500°C for 1 hour. The ash mass values of zooplankton and phytoplankton are expressed in grams per cubic meter (g/m^3), and periphyton and benthic organisms in grams per square meter (g/m^2).

Dry mass refers to the weight of residue present after drying in an oven at 60°C for zooplankton and 105°C for periphyton, until the mass remains unchanged. This mass represents the total organic matter, ash and sediment, in the sample. Dry mass values are expressed in the same units as ash mass.

Organic mass or volatile mass of the living substance is the difference between the dry mass and the ash mass, and represents the actual mass of the living matter. The organic mass is expressed in the same units as for ash mass and dry mass.

Wet mass is the mass of living matter plus contained water.

Bottom material: See Bed Material.

Cells/volume refers to the number of cells or any organism which is counted by using a microscope and grid or counting cell. Many planktonic organisms are multicelled and are counted according to the number of contained cells per sample, usually milliliters (mL) or liters (L).

Cfs-day is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, approximately 1.9835 acre-feet, or about 646,000 gallons or 2,447 cubic meters.

Chemical oxygen demand (COD) is a measure of the chemically oxidizable material in the water, and furnishes an approximation of the amount of organic and reducing material present. The determined value may correlate with natural water color or with carbonaceous organic pollution from sewage or industrial wastes.

Chlorophyll refers to the green pigments of plants. Chlorophyll *a* and *b* are the two most common pigments in plants.

Color unit is produced by one milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of the platinum-cobalt scale.

Contents is the volume of water in a reservoir or lake. Unless otherwise indicated, volume is computed on the basis of a level pool and does not include bank storage.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, an artificial structure, or a uniform cross section over a long reach of the channel.

Cubic feet per second per square mile (CFSM) is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

Cubic foot per second (ft^3/s , ft^3/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to approximately 7.48 gallons per second or 448.8 gallons per minute or 0.02832 cubic meters per second.

Discharge is the volume of water (or more broadly, volume of fluid plus suspended sediment), that passes a given point within a given period of time.

Mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period.

Instantaneous discharge is the discharge at a particular instant

of time.

Annual 7-day minimum is the lowest mean discharge for 7 consecutive days for a calendar year or a water year. Note that most low-flow frequency analyses of annual 7-day minimum flows use a climatic year (April 1-March 31). The date shown in the summary statistics table is the initial date of the 7-day period. (This value should not be confused with the 7-day 10-year low-flow statistic.)

Dissolved refers to the amount of substance present in true chemical solution. In practice, however, the term includes all forms of substance that will pass through a 0.45-micrometer membrane filter, and thus may include some very small (colloidal) suspended particles. Analyses are performed on filtered samples.

Dissolved-solids concentration of water is determined either analytically by the "residue-on-evaporation" method, or mathematically by totaling the concentrations of individual constituents reported in a comprehensive chemical analysis. During the analytical determination of dissolved solids, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. Therefore, in the mathematical calculation of dissolved-solids concentration, the bicarbonate value, in milligrams per liter, is multiplied by 0.492 to reflect the change.

Diversity index is a numerical expression of evenness of distribution of aquatic organisms. The formula for diversity index is:

$$\bar{d} = - \sum_{i=1}^s \frac{n_i}{n} \log_2 \frac{n_i}{n}$$

Where ' n_i ' is the number of individuals per taxon, ' n ' is the total number of individuals, and ' s ' is the total number of taxa in the sample of the community. Diversity index values range from zero when all the organisms in the sample are the same, to some positive number, when some or all of the organisms in the sample are different.

Drainage area of a stream at a specified location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the river above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise noted.

Drainage basin is a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water.

Gage height (G.H.) is the water-surface elevation referred to some arbitrary gage datum. Gage height is often used interchangeably with the more general term "stage", although gage height is more appropriate when used with a reading on a gage.

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of hydrologic data are obtained.

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is attributable to the presence of alkaline earths (principally calcium and magnesium) and is expressed as equivalent calcium carbonate (CaCO_3).

Hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the Office of Water Data Coordination on the State Hydrologic Unit Maps; each hydrologic unit is identified by an 8-digit number.

Metamorphic stage refers to the stage of development that an organism exhibits during its transformation from an immature form to an adult form. This developmental process exists for most insects, and the degree of difference from the immature stage to the adult form varies from relatively slight to pronounced, with many intermediates. Examples of metamorphic

stages of insects are egg-larva-adult or egg-nymph-adult.

Methylene blue active substance (MBAS) is a measure of apparent detergents. This determination depends on the formation of a blue color when methylene blue dye reacts with synthetic detergent compounds.

Micrograms per gram (UG/G, ug/g) is a unit expressing the concentration of a chemical element as the mass (micrograms) of the element sorbed per unit mass (gram) of sediment.

Micrograms per kilogram (MG/KG, mg/kg) is a unit expressing the concentration of a chemical element as the mass (micrograms) of the element sorbed per unit mass (kilogram) of sediment.

Micrograms per liter (UG/L, ug/L) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter.

Milligrams per liter (MG/L, mg/L) is a unit for expressing the concentration of chemical constituents in solution. Milligrams per liter represent the mass of solute per unit volume (liter) of water. Concentration of suspended sediment also is expressed in mg/L, and is based on the mass of sediment per liter of water-sediment mixture.

National Geodetic Vertical Datum of 1929 (NGVD) is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called "Sea Level Datum of 1929" or "mean sea level" in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, it does not necessarily represent local mean sea level at any particular place.

National Stream Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research.

The National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

Normal is a central value (such as median) for a 30-year period ending with an even 10-year, e.g. 1931-60, or 1961-90.

Organism is any living entity, such as an insect, phytoplankton, or zooplankton.

Organism count/area refers to the number of organisms collected and enumerated in a sample and adjusted to the number per area habitat, usually square meters (m²), acres, or hectares. Periphyton, benthic organisms, and macrophytes are expressed in these terms.

Organism count/volume refers to the number of organisms collected and enumerated in a sample and adjusted to the number per sample volume, usually milliliters (mL) or liters (L). Numbers of planktonic organisms can be expressed in these terms.

Total organism count is the total number of organisms collected and enumerated in any particular sample.

Parameter code numbers are unique five-digit code numbers assigned to each parameter placed into storage. These codes are assigned by the Environmental Protection Agency and are also used to identify data exchanged among agencies.

Partial-record station is a particular site where limited streamflow and (or) water-quality data are collected systematically over a period of years for use in hydrologic analyses.

Particle size is the diameter, in millimeters (mm), of suspended sediment or bed material determined by either sieve or sedimentation methods. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube) determine fall diameter of particles in distilled water (chemically dispersed).

Particle-size classification used in this report agrees with recommendations made by the American Geophysical Union Subcommittee on Sediment Terminology.

The classification is as follows:

Classification	Size (mm)	Method of analysis
Clay	0.00024- 0.004	Sedimentation
Silt	.004 - .062	Sedimentation
Sand	.062 - 2.0	Sedimentation or sieve
Gravel	2.0 - 64.0	Sieve

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. Most of the organic material is removed and the sample is subjected to mechanical and chemical dispersion before analysis in distilled water.

Percent composition is a unit for expressing the ratio of a particular part of a sample or population to the total sample or population, in terms of types, numbers, mass or volume.

Periphyton is the assemblage of microorganisms attached to and growing upon solid surfaces. While primarily consisting of algae, they also include bacteria, fungi, protozoa, rotifers, and other small organisms. Periphyton is a useful indicator of water quality.

Pesticides are chemical compounds used to control undesirable plants and animals. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides. Insecticides and herbicides, which control insects and plants respectively, are the two categories reported.

pH is a measure of the acidity (or alkalinity) of a solution; equal to the negative logarithm of the concentration of the hydrogen ions. A pH of 7.0 indicates a neutral solution, a pH value lower than 7.0 indicates an acid solution, and a pH greater than 7.0 indicates an alkaline solution.

Picocurie (PC, pCi) is one trillionth (1×10^{-12}) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields 3.7×10^{10} radioactive disintegrations per second. A picocurie yields 2.22 dpm (disintegrations per minute).

Plankton is the community of suspended, floating, or weakly swimming organisms that live in the open water of lakes and rivers.

Phytoplankton is the plant part of the plankton. They are usually microscopic and their movement is subject to the water currents. Phytoplankton growth is dependent upon solar radiation and nutrient substances. Because they are able to incorporate as well as release materials to the surrounding water, the phytoplankton have a profound effect upon the quality of the water. They are the primary food producers in the aquatic environment, and are commonly known as algae.

Blue-green algae are a group of phytoplankton organisms having a blue pigment, in addition to the green pigment called chlorophyll. Blue-green algae often cause nuisance conditions in water.

Diatoms are the unicellular or colonial algae having a siliceous shell. Their concentrations are expressed as number of cells/mL of sample.

Green algae have chlorophyll pigments similar in color to those of higher green plants. Some forms produce algal mats or floating "moss" in lakes. Their concentrations are expressed as number of cells/mL of sample.

Zooplankton is the animal part of the plankton. Zooplankton are capable of extensive movements within the water column, and are often large enough to be seen with the unaided eye. Zooplankton are secondary consumers feeding upon bacteria, phytoplankton, and detritus. Because they are the grazers in the aquatic environment, the zooplankton are a vital part of the aquatic food web. The zooplankton community is dominated by small crustaceans and rotifers.

Polychlorinated biphenyls (PCBs) are industrial chemicals that are mixtures of chlorinated biphenyl compounds having various percentages of chlorine. They are similar in structure to organo-chlorine insecticides.

Primary productivity is a measure of the rate at which new organic matter is formed and accumulated through photosynthetic and chemosynthetic activity of producer organisms (chiefly green plants). The rate of primary production is estimated by measuring the amount of oxygen released (oxygen method) or the amount of carbon assimilated by the plants (carbon method).

Milligrams of carbon per area or volume per unit time [$\text{mg C}/(\text{m}^2 \cdot \text{time})$ for periphyton and macrophytes and $\text{mg C}/(\text{m}^3 \cdot \text{time})$ for phytoplankton] are units for expressing primary productivity. They define the amount of carbon dioxide consumed as measured by radioactive carbon (carbon 14). The carbon 14 method is of greater sensitivity than the oxygen light and dark bottle method, and is preferred for use in unenriched waters. Unit time may be either the hour or day, depending on the incubation period.

Milligrams of oxygen per area or volume per unit time [$\text{mg O}_2/(\text{m}^2 \cdot \text{time})$ for periphyton and macrophytes and $\text{mg O}_2/(\text{m}^3 \cdot \text{time})$ for phytoplankton] are the units for expressing primary productivity. They define production and respiration rates as estimated from changes in the measured dissolved oxygen concentration. The oxygen light and dark bottle method is preferred if the rate of primary production is sufficient for accurate measurements to be made within 24 hours. Unit time may be either the hour or day, depending on the incubation period.

Radiochemical program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Recoverable from bottom material is the amount of a given constituent that is in solution after a representative sample of bottom material has been digested by a method (usually using an acid or mixture of acids) that results in dissolution of only readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment and thus the determination represents less than the total amount (that is, less than 95 percent) of the constituent in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Return period is the average time interval between occurrences of a hydrological event of a given or greater magnitude, usually expressed

in years. May also be called recurrence interval.

Runoff in inches (IN, in) shows the depth to which the drainage area would be covered if all the runoff for a given time period were uniformly distributed on it.

Sea level: In this report "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)—a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land usage, and precipitation.

Bed load is the sediment that is transported in a stream by rolling, sliding, or skipping along the bed and very close to it. In this report, bed load is considered to consist of particles in transit within 0.25 ft of the streambed.

Bed load discharge (tons per day) is the quantity of bed load measured by dry weight that moves past a section as bed load in a given time.

Suspended sediment is the sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.

Suspended-sediment concentration is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 ft above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L).

Mean concentration is the time-weighted concentration of suspended sediment passing a stream section during a 24-hour day.

Suspended-sediment discharge (tons/day) is the rate at which dry weight of sediment passes a section of a stream or is the quantity sediment, as measured by dry weight or volume, that passes a section in a given time. It is computed by multiplying discharge times mg/L times 0.0027.

Suspended-sediment load is quantity of suspended sediment passing a section in a specified period.

Total sediment discharge (tons/day) is the sum of the suspended-sediment discharge and the bed-load discharge. It is the total quantity of sediment, as measured by dry weight or volume, that passes a section during a given time.

Total sediment load or total load is a term which refers to the total sediment (bed load plus suspended-sediment load) that is in transport. It is not synonymous with total-sediment discharge.

7-day 10 year low flow ($7 Q_{10}$) is the discharge at the 10-year recurrence interval taken from a frequency curve of annual values of the lowest mean discharge for 7 consecutive days (the 7-day low flow).

Sodium-adsorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions within soil and is an index of sodium or alkali hazard to the soil. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are generally unsatisfactory for irrigation.

Solute is any substance derived from the atmosphere, vegetation, soil, or rocks that is dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25°C. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids content

of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 percent of the specific conductance (in microsiemens). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

Stage-discharge relation is the relation between gage height (stage) and volume of water per unit of time, flowing in a channel.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as a streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Substrate is the physical surface upon which an organism lived.

Natural substrates refers to any naturally occurring emerged or submersed solid surface, such as a rock or tree, upon which an organism lived.

Artificial substrate is a device which is purposely placed in a stream or lake for colonization of organisms. The artificial substrate simplifies the community structure by standardizing the substrate from which each sample is taken. Examples of artificial substrates are basket samplers (made of wire cages filled with clean streamside rocks) and multi-plate samplers (made of hardboard) for benthic organism collection, and plexiglass strips for periphyton collection.

Surface area of a lake is that area outlined on the latest USGS topographic map as the boundary of the lake and measured by a planimeter in acres. In localities not covered by topographic maps, the areas are computed from the best maps available at the time planimeted. All areas shown are those for the stage when the planimeted map was made. All areas shown are those for the stage when the planimeted map was made.

Surficial bed material is that part (0.1 to 0.2 ft) of the bed material that is sampled using U.S. Series Bed-Material Samplers.

Suspended (as used in tables of chemical analyses) refers to the amount (concentration) of the total concentration in a water-sediment mixture. The water-sediment mixture is associated with (or sorbed on) that material retained on a 0.45 micrometer filter.

Suspended, recoverable is the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45 micrometer filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Determinations of "suspended, recoverable" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total recoverable concentrations of the constituent.

Suspended, total is the total amount of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45 μ m membrane filter. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as "suspended, total."

Determinations of "suspended, total" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total concentrations of the constituent.

Taxonomy is the division of biology concerned with the classification of organisms is based upon a hierarchical scheme beginning with Kingdom and ending with Species at the base. The higher the classification level, the fewer features the organisms have in common.

For example, the taxonomy of a particular mayfly, *Hexagenia limbata* is the following:

Kingdom.....Animal

Phylum.....Arthropoda

Class.....Insects

Order.....Ephemeroptera

Family.....Ephemeridae

Genus.....Hexagenia

Species.....Hexagenia limbata

Thermograph is an instrument that continuously records variations of temperature on a chart. The more general term "temperature recorder" is used in the table headings and refers to any instrument that records temperature whether on a chart, a tape, or any other medium.

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the stream each day for the year.

Tons per acre-foot indicates the dry mass of dissolved solids in 1 acre-foot of water. It is computed by multiplying the concentration in milligrams per liter by 0.00136.

Tons per day is the quantity of substance in solution or suspension that passes a stream section during a 24-hour day.

Total is the total amount of a given constituent in a representative water-suspended sediment sample, regardless of the constituent's physical or chemical form. The term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total." (Note that the word "total" does double duty here, indicating both that the sample consists of a water-suspended sediment mixture and that the analytical methods determines all of the constituent in the sample.)

Total in bottom material is the total amount of a given constituent in a representative sample of bottom material. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total in bottom material."

Total load (tons) is the total quantity of any individual constituent, as measured by dry mass or volume, that is dissolved in a specific amount of water (discharge) during a given time. It is computed by multiplying the total discharge, times the mg/L of the constituent, times the factor 0.0027, times the number of days.

Total recoverable refers to the amount of a given constituent that is in solution after a representative water-suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the dissolved and suspended phases of the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to

produce different analytical results.

Tritium Network is a network of stations which has been established to provide baseline information on the occurrence of tritium in the Nation's surface waters. In addition to the surface-water stations in the network, tritium data are also obtained at a number of precipitation stations. The purpose of the precipitation stations is to provide an estimate sufficient for hydrologic studies of the tritium input to the United States.

Water year in Geological Survey reports dealing with surface-water supply is the 12-month period, October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 1992 is called the "1992 water year."

WDR is used as an abbreviation for "Water-Data Report" in reference to published reports beginning in 1975.

Weighted average is used in this report to indicate discharge-weighted average. It is computed by multiplying the discharge for a sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given location during the water year after thorough mixing in the reservoir.

WRD is used as an abbreviation for "Water-Resources Data" in the REVISED RECORDS paragraph to refer to State annual basic-data reports published before 1975.

WSP is used as an abbreviation for "Water-Supply Paper" in references to previously published reports.

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

The U.S. Geological Survey publishes a series of manuals describing procedures for planning and conducting specialized work in water-resources investigations. The material is grouped under major subject headings called books and is further divided into sections and chapters. For example, Section A of Book 3 (Applications of Hydraulics) pertains to surface water. The chapter, the unit of publication, is limited to a narrow field of subject matter. This format permits flexibility in revision and publication as the need arises.

The reports listed below are for sale by the U.S. Geological Survey, Branch of Information Services, Box 25286, Federal Center, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office). Prepayment is required. Remittance should be sent by check or money order payable to the U.S. Geological Survey. Prices are not included because they are subject to change. Current prices can be obtained by writing to the above address. When ordering or inquiring about prices for any of these publications, please give the title, book number, chapter number, and "U.S. Geological Survey Techniques of Water-Resources Investigations."

- 1-D1. *Water temperature--influential factors, field measurement, and data presentation*, by H. H. Stevens, Jr., J. F. Ficke, and G. F. Smoot: USGS--TWRI Book 1, Chapter D1. 1975. 65 pages.
- 1-D2. *Guidelines for collection and field analysis of ground-water samples for selected unstable constituents*, by W. W. Wood: USGS--TWRI Book 1, Chapter D2. 1976. 24 pages.
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**Surface-Water
Station Records**

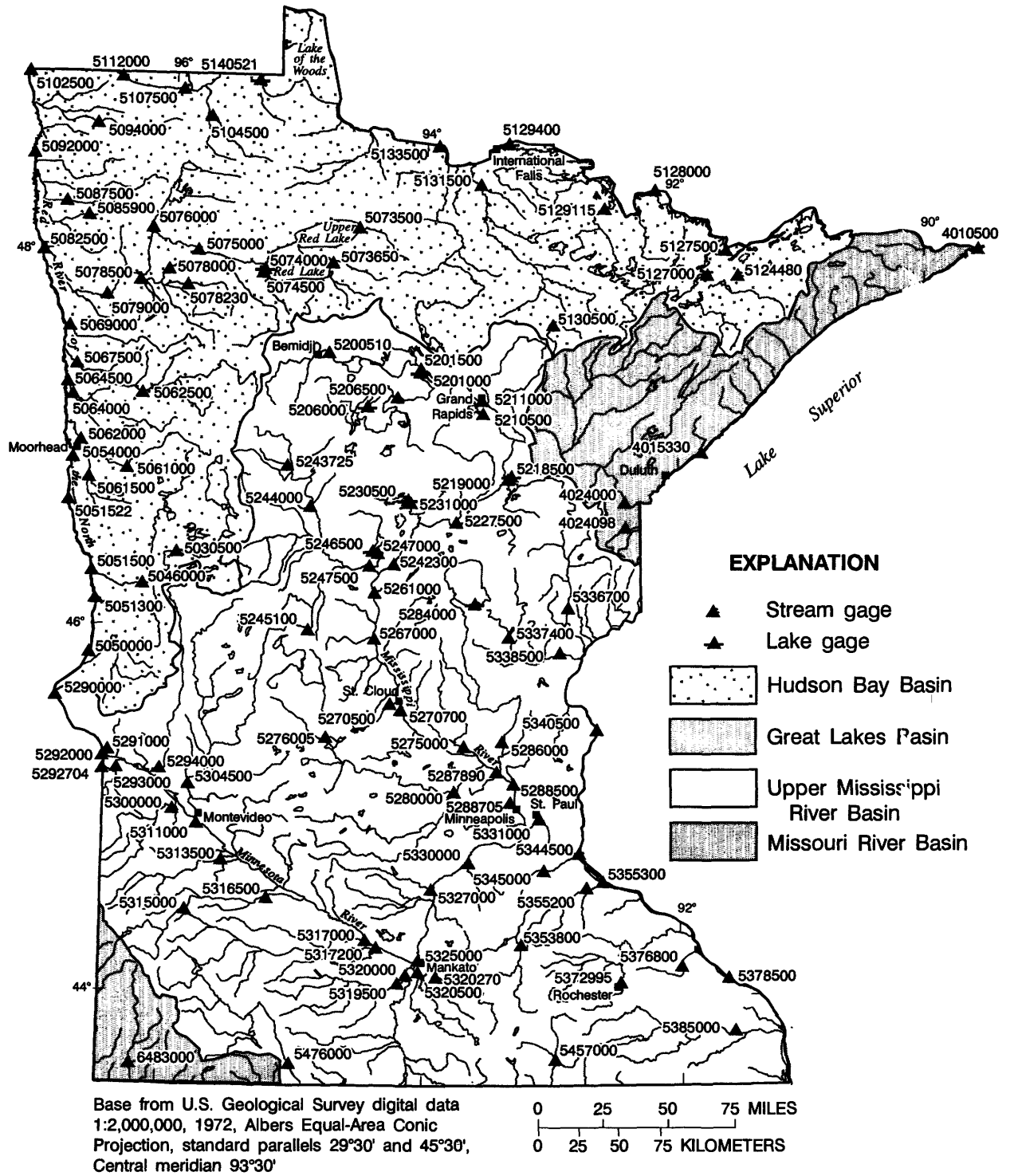


Figure 7.--Location of lake and stream-gaging stations

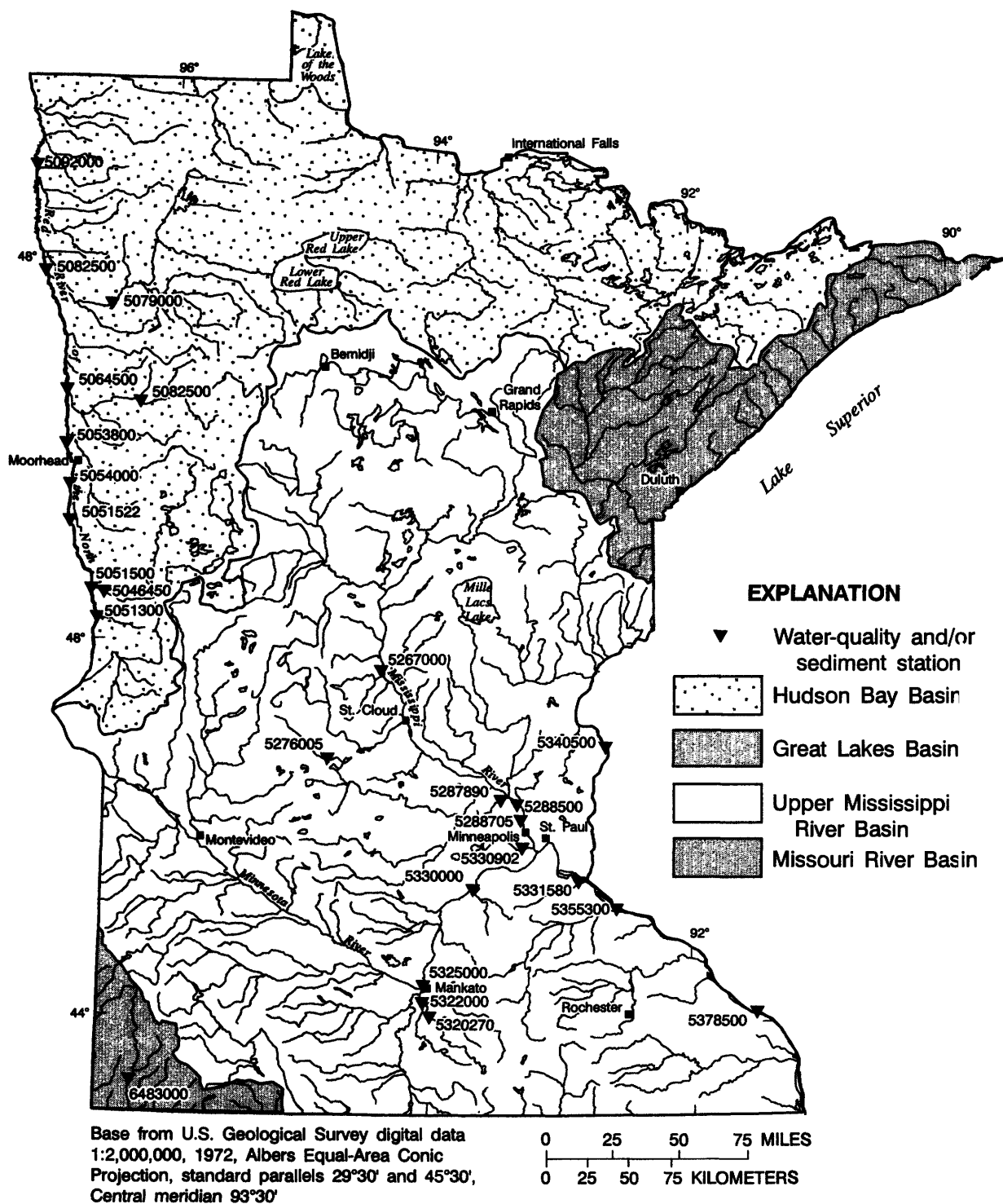


Figure 8.—Location of surface-water quality stations.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04010500 PIGEON RIVER AT MIDDLE FALLS, NEAR GRAND PORTAGE, MN

(International gaging station)

LOCATION.--Lat 48°00'44", long 89°36'58", in SW¹/₄NE¹/₄ sec. 24, T.64 N., R.6 E., Cook County, Hydrologic Unit 04010101, on the Grand Portage Indian Reservation, on right bank 400 ft upstream from Middle Falls, 2.5 mi upstream from Grand Portage Port of Entry, 3.5 mi upstream from mouth, and 4.7 mi northeast of city of Grand Portage.

DRAINAGE AREA.--600 mi².

PERIOD OF RECORD.--June to October 1921, April to November 1922, March 1923 to current year. Published as "at International Bridge" April 1924 to September 1940; as "below International Bridge" October 1940 to September 1965. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.--WSP 744:1927-28. WSP 804: 1934(M). WSP 974: Drainage area. WSP 1337:1924(M), 1925, 1926-28(M), 1931(M), 1938(M), 1941(M), 1945-46(M), 1947, 1948(M), 1950(M).

GAGE.--Water-stage recorder. Datum of gage is 787.58 ft above sea level. Prior to Sept. 30, 1940, nonrecording gage at International Bridge, 5.8 mi upstream at datum 102.24 ft higher. Oct. 1, 1940 to Dec. 31, 1975, at present site at datum 2.00 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Satellite telemeter at station.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 17	1400	a990	a*8.98	July 02	1930	*3810	8.88

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	223	849	e205	e325	e260	e150	e190	2470	835	507	220	67
2	206	668	e200	e325	e255	e150	e230	2150	790	2130	209	64
3	194	618	e195	e325	e245	e150	e440	1900	753	3400	197	62
4	190	532	e190	e325	e240	e150	e600	1720	715	2440	186	61
5	187	475	e190	e325	e235	e150	e900	1630	679	1610	171	65
6	167	457	e190	e325	e225	e150	e1300	1570	655	1160	162	65
7	153	556	e190	e325	e220	e145	e1500	1470	669	957	154	63
8	147	537	e190	e320	e215	e145	e1300	1530	648	807	145	65
9	144	486	e190	e320	e210	e145	e1200	1610	624	701	138	66
10	138	400	e190	e320	e205	e145	e1100	1570	596	623	135	63
11	139	e360	e195	e320	e200	e145	e950	1470	567	564	130	60
12	137	e330	e195	e320	e190	e145	e880	1760	548	520	127	58
13	131	e290	e200	e320	e185	e145	e860	1810	522	491	120	55
14	124	e260	e200	e320	e180	e140	e920	1670	488	469	112	53
15	123	e300	e205	e320	e180	e140	e1150	1580	459	562	108	52
16	126	e290	e210	e320	e175	e140	e1350	1490	453	615	106	52
17	259	e990	e215	e310	e175	e140	e1250	1470	446	571	100	52
18	440	e940	e225	e310	e170	e140	e1180	1400	434	518	94	54
19	371	e760	e230	e305	e170	e140	e1130	1370	426	470	90	57
20	318	e550	e240	e305	e165	e140	1110	1370	403	425	95	56
21	272	e420	e250	e300	e165	e140	1240	1330	379	393	92	53
22	250	e350	e260	e300	e165	e140	1430	1260	362	367	88	50
23	297	e310	e270	e295	e160	e140	1530	1200	359	341	85	48
24	572	e290	e275	e295	e160	e140	1800	1200	499	322	82	46
25	573	e260	e285	e290	e160	e140	2230	1190	1540	308	79	44
26	530	e245	e295	e285	e155	e140	2470	1130	1260	298	77	43
27	506	e230	e300	e285	e155	e145	2750	1070	921	291	74	43
28	441	e225	e310	e280	e155	e150	2830	1010	723	277	73	47
29	432	e220	e315	e275	---	e155	2860	959	601	263	72	47
30	1460	e210	e320	e275	---	e160	2770	912	534	248	71	47
31	1230	---	e325	e270	---	e170	---	875	---	232	70	---
TOTAL	10480	13408	7250	9535	5375	4515	41450	45146	18888	22880	3662	1658
MEAN	338	447	234	308	192	146	1382	1456	630	738	118	55.3
MAX	1460	990	325	325	260	170	2860	2470	1540	3400	220	67
MIN	123	210	190	270	155	140	190	875	359	232	70	43
AC-FT	20790	26590	14380	18910	10660	8960	82220	89550	37460	45380	7260	3290
CFSM	.56	.74	.39	.51	.32	.24	2.30	2.43	1.05	1.23	.20	.09
IN.	.65	.83	.45	.59	.33	.28	2.57	2.80	1.17	1.42	.22	.10

a Daily-mean discharge, backwater from ice.

e Estimated

STREAMS TRIBUTARY TO LAKE SUPERIOR

04010500 PIGEON RIVER AT MIDDLE FALLS, NEAR GRAND PORTAGE, MN--Continued

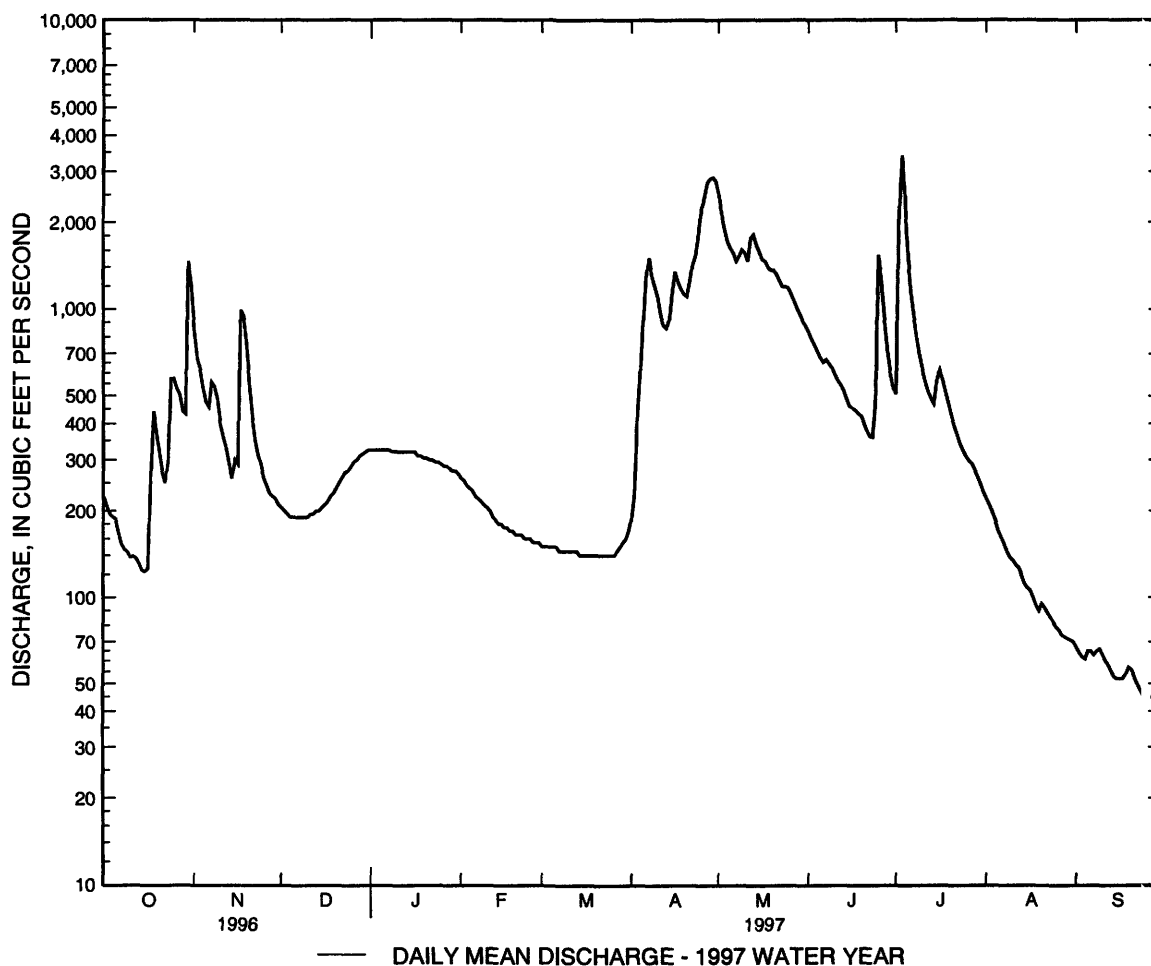
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	361	349	204	151	126	174	1188	1634	854	420	241	295
MAX	2095	1461	720	431	300	1169	2701	4016	2801	1127	1029	2985
(WY)	1978	1971	1978	1975	1969	1945	1976	1950	1947	1968	1950	1977
MIN	17.4	11.4	2.85	2.18	8.02	60.0	290	138	125	78.0	57.7	40.2
(WY)	1977	1977	1977	1977	1977	1941	1977	1977	1977	1958	1991	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1921 - 1997
ANNUAL TOTAL	246715	184247	
ANNUAL MEAN	674	505	503
HIGHEST ANNUAL MEAN			840
LOWEST ANNUAL MEAN			158
HIGHEST DAILY MEAN	6220	May 19	3400 Jul 3 10700 May 5 1934
LOWEST DAILY MEAN	123	Oct 15	43 Sep 26,27 1.0 Jan 15-21 1977
ANNUAL SEVEN-DAY MINIMUM	131	Oct 10	45 Sep 24 1.0 Jan 15 1977
INSTANTANEOUS PEAK FLOW		3810	Jul 2 11000 May 5 1934
INSTANTANEOUS PEAK STAGE		8.98 ^a	Nov 17 7.60 ^b May 5 1934
INSTANTANEOUS LOW FLOW		42	Sep 27
ANNUAL RUNOFF (AC-FT)	489400	365500	364100
ANNUAL RUNOFF (CFSM)	1.12	.84	.84
ANNUAL RUNOFF (INCHES)	15.30	11.42	11.38
10 PERCENT EXCEEDS	1790	1360	1300
50 PERCENT EXCEEDS	274	285	221
90 PERCENT EXCEEDS	169	78	85

a Backwater from ice.

b Site and datum then in use.



STREAMS TRIBUTARY TO LAKE SUPERIOR
04015330 KNIFE RIVER NEAR TWO HARBORS, MN

LOCATION.--Lat 46°56'49", long 91°47'32", in SW 1/4 NW 1/4 sec. 31, T.52 N., R.11 W., Lake County, Hydrologic Unit 04010102, on right bank 600 ft downstream from bridge on U.S. Highway 61, 0.5 mi upstream from bridge on County Highway 102, in town of Knife River, 0.8 mi upstream from Lake Superior, and 7.8 mi southwest of Two Harbors.

DRAINAGE AREA.--85.6 mi².

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1970-71, July 1974 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 640 ft above sea level from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 800 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 30	0500	2040	6.74	Apr 19	0515	991	5.36
Nov 17	--	a1350	7.02	Apr 22	0015	865	5.19
Apr 06	--	a1600	(Ice Jam)	June 18	0800	1060	5.56
Apr 14	2245	891	5.23	June 24	1830	*5780	*10.29

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	137	e182	e60	e26	e20	e21	e170	191	35	31	9.8	8.5
2	99	e120	e57	e28	e20	e21	e180	156	31	38	9.3	7.7
3	75	e88	e54	e27	e20	e21	e400	133	28	48	8.7	7.0
4	61	e67	e52	e27	e20	e20	e740	111	27	143	8.9	6.4
5	54	e58	e50	e27	e20	e20	e1000	100	51	84	9.8	6.4
6	49	e140	e48	e26	e20	e20	e1600	94	81	58	9.6	6.5
7	41	e260	e46	e26	e20	e20	e1080	82	54	41	7.9	6.6
8	38	e200	e45	e26	e20	e20	967	139	47	34	7.2	7.0
9	42	e150	e43	e25	e20	e20	752	130	37	29	7.1	8.6
10	42	e110	e41	e25	e20	e20	523	99	30	23	7.3	7.3
11	37	e85	e36	e25	e20	e20	402	86	24	20	8.2	6.8
12	34	e65	e33	e25	e20	e20	383	97	21	18	7.9	6.3
13	32	e40	e30	e24	e20	e20	405	85	19	18	7.2	5.9
14	29	e54	e27	e24	e20	e20	596	81	17	24	7.3	5.9
15	29	e90	e25	e24	e20	e20	796	81	20	20	7.5	6.5
16	29	e650	e25	e24	e20	e20	605	71	34	18	8.4	7.2
17	146	e1350	e25	e23	e20	e20	437	64	26	18	9.3	9.5
18	244	e500	e25	e23	e20	e20	618	59	589	15	8.6	11
19	149	e200	e24	e23	e20	e20	860	78	215	13	7.4	104
20	119	e150	e24	e23	e20	e20	787	92	114	13	18	56
21	104	e100	e24	e22	e21	e21	783	74	67	12	27	29
22	97	e76	e24	e22	e21	e21	720	61	43	12	20	20
23	261	e60	e24	e22	e22	e22	654	61	31	11	15	15
24	419	e50	e24	e22	e23	e22	573	130	1410	11	13	12
25	241	e47	e24	e21	e22	e23	510	115	1390	15	12	11
26	185	e47	e24	e21	e22	e24	423	79	242	28	11	10
27	320	e54	e24	e21	e21	e26	417	60	99	20	10	9.6
28	233	e62	e24	e20	e21	e34	363	50	58	17	8.7	10
29	245	e66	e25	e20	---	e50	305	45	54	14	8.0	15
30	1420	e65	e25	e20	---	e190	252	46	42	12	8.0	15
31	e480	---	e25	e20	---	e180	---	41	---	11	7.7	---
TOTAL	5491	5186	1037	732	573	1016	18301	2791	4936	869	315.8	437.7
MEAN	177	173	33.5	23.6	20.5	32.8	610	90.0	165	28.0	10.2	14.6
MAX	1420	1350	60	28	23	190	1600	191	1410	143	27	104
MIN	29	40	24	20	20	20	170	41	17	11	7.1	5.9
AC-FT	10890	10290	2060	1450	1140	2020	36300	5540	9790	1720	626	868
CFSM	2.07	2.02	.39	.28	.24	.38	7.13	1.05	1.92	.33	.12	.17
IN.	2.39	2.25	.45	.32	.25	.44	7.95	1.21	2.15	.38	.14	.19

a Daily-mean discharge, backwater from ice.

e Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

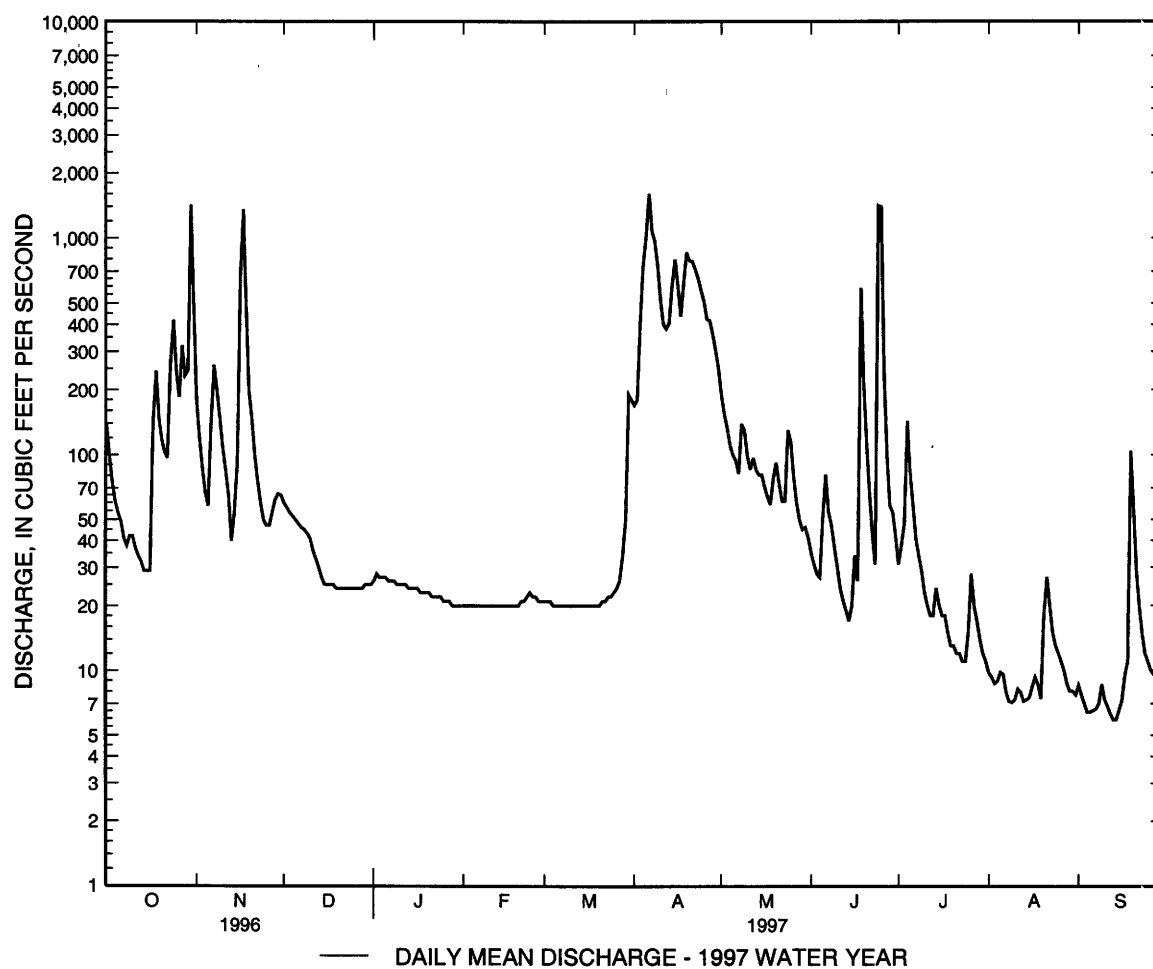
04015330 KNIFE RIVER NEAR TWO HARBORS, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	94.6	74.9	22.3	11.8	9.49	52.0	379	163	91.7	86.6	37.0	84.3
MAX	267	198	60.6	31.4	22.2	136	631	427	241	345	163	314
(WY)	1996	1992	1983	1975	1984	1976	1982	1979	1984	1993	1988	1977
MIN	3.06	1.58	.000	.000	.000	8.65	73.6	16.0	13.0	4.87	2.95	1.43
(WY)	1977	1977	1977	1977	1977	1980	1977	1976	1995	1988	1976	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1974 - 1997
ANNUAL TOTAL	44536.5	41685.5	
ANNUAL MEAN	122	114	92.7
HIGHEST ANNUAL MEAN			147
LOWEST ANNUAL MEAN			44.2
HIGHEST DAILY MEAN	1990	Sep 27	1600
LOWEST DAILY MEAN	7.1	Aug 31	5.9
ANNUAL SEVEN-DAY MINIMUM	7.7	Aug 26	6.6
INSTANTANEOUS PEAK FLOW		5780	Jun 24
INSTANTANEOUS PEAK STAGE		10.29	Jun 24
INSTANTANEOUS LOW FLOW		.87	Aug 11
ANNUAL RUNOFF (AC-FT)	88340	82680	67180
ANNUAL RUNOFF (CFSM)	1.42	1.33	1.08
ANNUAL RUNOFF (INCHES)	19.35	18.12	14.72
10 PERCENT EXCEEDS	321	311	230
50 PERCENT EXCEEDS	39	26	23
90 PERCENT EXCEEDS	16	9.4	4.9

a Many days in 1977.



STREAMS TRIBUTARY TO LAKE SUPERIOR
04024000 ST. LOUIS RIVER AT SCANLON, MN

LOCATION.--Lat 46°42'12", long 92°25'07", in NW¼ sec. 30, T.49 N., R.16 W., Carlton County, Hydrologic Unit 04010201, on right bank 25 ft downstream from lower bridge on U.S. Highway 61 at Scanlon, 0.6 mi downstream from Minnesota Power Co. power plant, 3 mi upstream from Thomson Reservoir, and 3.2 mi upstream from Midway River.

DRAINAGE AREA.--3,430 mi², approximately.

PERIOD OF RECORD.--January 1908 to current year. Monthly discharge only for some periods published in WSP 1307. Published as "near Thomson" 1908-50.

REVISED RECORDS.--WSP 1337: 1911-12.

GAGE.--Water-stage recorder. Datum of gage is 1,101.23 ft above sea level. Oct. 5, 1909 to Sept. 5, 1914, nonrecording gage 3 mi downstream and 50 ft below power plant at datum about 420 ft lower. Sept. 6, 1914 to Aug. 4, 1953, power plant record at Thomson hydroelectric plant.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Diurnal fluctuation caused by power plant upstream.

Flow regulated by Whiteface Reservoir and Boulder, Island, Rice and Fish Lakes, combined capacity, 332,160 acre-ft; the water-discharge table shows the monthly change in contents (+).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES														
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	1810	e5500	e3700	e1950	e1650	e1400	e3300	7010	2380	8010	1110	639		
2	1730	e5800	e3500	e2000	e1650	e1400	e3900	6520	2180	7580	899	590		
3	1540	e5400	e3300	e2000	e1650	e1400	e5000	6250	2050	7830	882	568		
4	1460	e5200	e3150	e2000	e1650	e1400	e7500	5860	1910	10100	909	530		
5	1450	e5000	e3000	e2000	e1650	e1400	e10000	5290	1760	10200	905	586		
6	1390	e5100	e2900	e1900	e1650	e1400	e16500	4590	1820	8630	809	542		
7	1350	e6000	e2850	e1700	e1650	e1400	e19500	4240	1870	7300	774	490		
8	1280	e7400	e2800	e1800	e1650	e1400	21100	4090	1750	6250	723	499		
9	1240	e6400	e2750	e1900	e1650	e1400	20100	3830	1680	5480	706	544		
10	1190	e5400	e2700	e1900	e1600	e1400	18000	3860	1560	4770	667	479		
11	1170	e4900	e2650	e1850	e1600	e1400	16300	3760	1470	4050	658	503		
12	1200	e5000	e2600	e1800	e1550	e1400	15700	3580	1340	3420	632	487		
13	1150	e5300	e2550	e1750	e1500	e1400	15500	3620	1200	3230	619	494		
14	1130	e4500	e2500	e1800	e1500	e1400	14700	3700	1180	3710	552	461		
15	1130	e3600	e2400	e1900	e1500	e1400	14600	4000	1230	3860	558	501		
16	1120	e3200	e2300	e1900	e1500	e1400	13800	4340	1050	3530	617	471		
17	1450	e5000	e2200	e1700	e1450	e1450	12500	4390	1050	3080	537	615		
18	2140	e7400	e2200	e1700	e1450	e1550	11800	4220	1170	2680	572	524		
19	2980	e8000	e1980	e1800	e1450	e1700	11900	4210	1270	2230	530	836		
20	3050	e7600	e1850	e1900	e1450	e1900	12500	4430	1360	1790	819	1480		
21	2860	e6600	e1950	e1850	e1450	e2200	12500	4520	1300	1560	743	1490		
22	2570	e6700	e2100	e1800	e1400	e2200	11900	4160	1160	1480	843	1330		
23	2510	e6500	e2000	e1750	e1400	e2100	11400	4000	1140	1320	763	1100		
24	2790	e6000	e1900	e1700	e1400	e2050	10700	4170	1920	1220	744	1090		
25	3000	e5500	e1700	e1700	e1400	e2050	10000	4400	4930	1640	719	1000		
26	3090	e5000	e1800	e1600	e1400	e2100	9430	4190	7050	2070	736	847		
27	3080	e4600	e1900	e1600	e1400	e2250	8930	3870	6340	2340	627	829		
28	2930	e4300	e2100	e1600	e1400	e2400	8510	3420	5900	2080	681	936		
29	2770	e4100	e2200	e1600	---	e2600	8170	3270	8390	1750	569	824		
30	3590	e3900	e2150	e1650	---	e2700	7570	2950	8370	1380	642	876		
31	4840	---	e2100	e1650	---	e2950	---	2640	---	1060	659	---		
TOTAL	64990	164900	75780	55750	42650	54600	363310	133380	77780	125630	22204	22161		
MEAN	2096	5497	2445	1798	1523	1761	12110	4303	2593	4053	716	739		
MAX	4840	8000	3700	2000	1650	2950	21100	7010	8390	10200	1110	1490		
MIN	1120	3200	1700	1600	1400	1400	3300	2640	1050	1060	530	461		
+	266	-17.8	-598	-572	-541	-676	2070	371	143	-210	-184	-83.0		
MEAN‡	2362	5479	1847	1226	982	1085	14180	4674	2736	3843	532	656		
CFSM ‡	.69	1.60	.54	.36	.29	.32	4.13	1.36	.80	1.12	.16	.19		
IN ‡	.80	1.79	.62	.42	.30	.37	4.61	1.57	.89	1.29	.18	.21		
CAL. YR. '96	TOTAL 1319975		MEAN 3606		MAX 27400		MIN 867		MEAN ‡ 3624		CFSM ‡ 1.06		IN ‡ 14.35	
WTR YR. '97	TOTAL 1203135		MEAN 3296		MAX 3296		MIN 461		MEAN ‡ 3292		CFSM ‡ .96		IN ‡ 13.03	

+ Change in contents, equivalent in cubic feet per second, in Whiteface Reservoir, and Boulder, Island, Rice and Fish Lakes; records furnished by Minnesota Power Co.

‡ Adjusted for change in reservoir contents.

e Estimated.

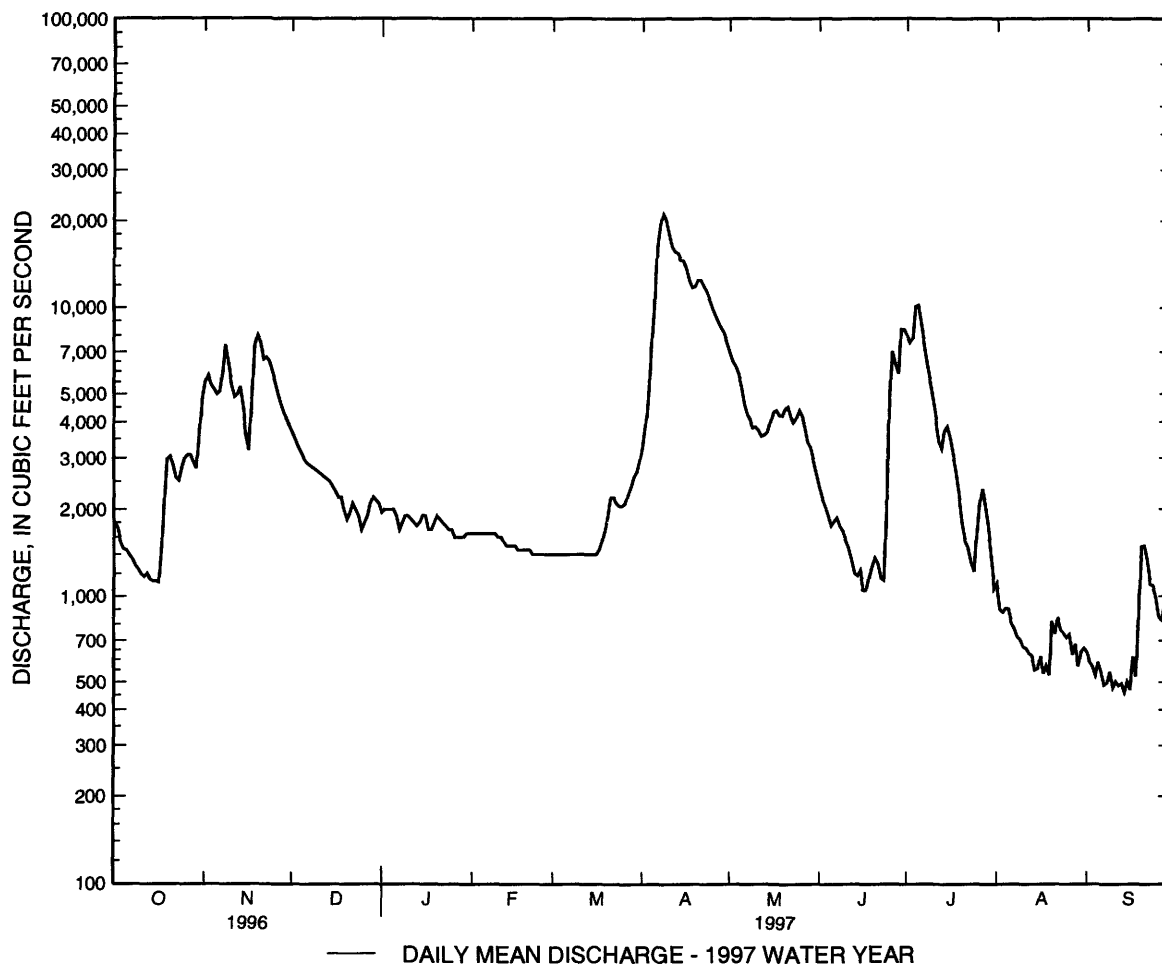
STREAMS TRIBUTARY TO LAKE SUPERIOR

04024000 ST. LOUIS RIVER AT SCANLON, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1908 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	2023	1725	1274	1074	1053	1441	5668	5122	3573	2421	1668	1766
MAX	7508	8518	2993	2272	2200	6026	15230	22210	16480	9492	9197	7594
(WY)	1974	1972	1972	1966	1966	1945	1948	1950	1908	1993	1953	1928
MIN	407	473	282	265	249	301	667	593	458	199	377	402
(WY)	1935	1935	1911	1911	1924	1924	1977	1977	1988	1988	1977	1934

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1908 - 1997
ANNUAL TOTAL	1319975	1203135	
ANNUAL MEAN	3606	3296	2388
HIGHEST ANNUAL MEAN			4276
LOWEST ANNUAL MEAN			945
HIGHEST DAILY MEAN	27400	Apr 21	37900
LOWEST DAILY MEAN	867	Sep 18	88
ANNUAL SEVEN-DAY MINIMUM	954	Sep 15	134
INSTANTANEOUS PEAK FLOW		22600	37900
INSTANTANEOUS PEAK STAGE		11.20 ^a	15.80
ANNUAL RUNOFF (AC-FT)	2618000	2386000	1730000
ANNUAL RUNOFF (CFSM)	1.05	.96	.70
ANNUAL RUNOFF (INCHES)	14.32	13.05	9.46
10 PERCENT EXCEEDS	6800	7530	5320
50 PERCENT EXCEEDS	2040	1900	1390
90 PERCENT EXCEEDS	1250	731	644

^a From highwater mark, backwater from ice.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04024098 DEER CREEK NEAR HOLYOKE, MN

LOCATION.--Lat 46°31'30", long 92°23'20", in NE¼SE¼ sec. 29, T.47 N., R.16 W., Carlton County, Hydrologic Unit 04010301, on left bank 179 ft west of State Highway No. 23, 0.9 mi upstream from mouth and 4.0 mi north of Holyoke.

DRAINAGE AREA.--7.77 mi².

PERIOD OF RECORD.--October 1976 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 786.14 ft above mean sea level.

REMARKS.--Records good, except those for estimated daily discharges, which are fair to poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

	DAILY MEAN VALUES											
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.6	5.3	1.4	e2.0	2.9	e2.8	e45	5.7	2.4	3.4	2.0	2.7
2	2.0	4.4	1.2	e1.9	2.9	e2.7	79	4.8	2.3	4.1	2.0	2.2
3	1.8	3.8	1.2	e1.9	2.8	2.7	99	4.1	2.2	4.8	2.1	1.9
4	1.8	3.8	1.5	e2.2	3.1	e2.7	101	4.0	4.3	14	2.1	1.8
5	1.8	3.8	1.5	e2.7	2.8	e2.7	97	3.7	11	5.4	2.0	2.0
6	1.8	8.1	1.4	e2.4	2.9	2.7	e115	3.5	5.6	4.2	1.9	2.2
7	1.7	12	1.4	e2.6	2.8	e2.7	e40	3.5	3.1	3.4	2.0	2.0
8	1.8	7.0	1.4	e2.2	e3.5	e2.7	e30	4.5	4.2	4.2	1.8	2.0
9	2.2	e4.0	1.4	2.0	2.6	e2.7	e22	4.0	3.0	3.9	1.8	2.3
10	1.7	e3.0	1.4	1.9	2.6	e2.7	e21	4.1	2.4	3.3	1.9	2.2
11	1.7	e1.7	1.2	e2.1	2.7	e2.7	e20	3.4	2.6	3.1	1.8	2.1
12	3.9	.58	1.2	e2.4	e2.9	e2.7	e23	3.2	2.2	3.2	1.8	2.1
13	3.6	.81	1.1	e2.1	e2.7	e2.7	e32	3.1	1.9	4.3	e1.8	2.1
14	2.2	1.5	.99	1.8	2.5	e2.8	e47	3.2	1.8	4.9	e1.8	2.1
15	2.2	1.9	1.0	e2.0	e2.7	e2.8	61	4.6	2.8	3.1	e1.9	2.2
16	2.0	56	1.2	e1.9	e2.8	e2.8	42	4.0	2.8	3.2	e2.0	2.4
17	10	118	1.3	e3.3	e2.9	e2.8	33	3.3	2.3	2.5	e2.3	2.7
18	5.9	e17	1.3	e3.2	e2.9	e2.9	44	4.4	2.5	2.1	e1.9	2.1
19	3.5	e8.0	1.4	e3.1	e2.9	e2.9	43	10	2.3	2.0	e1.9	2.3
20	2.7	e3.0	e1.6	e3.0	e2.9	e3.0	39	8.2	2.2	1.9	e3.2	2.2
21	2.3	e2.0	e1.8	e3.0	e2.9	e3.2	30	6.0	2.2	1.8	e6.0	2.0
22	2.2	e1.6	e1.9	e3.0	e2.9	e3.4	23	3.5	2.6	1.9	e3.5	2.0
23	10	1.5	e2.0	e3.0	e2.9	e3.6	20	3.7	2.6	1.9	e2.7	2.0
24	9.2	1.4	e1.8	e3.0	e2.9	e3.8	16	4.6	4.7	1.8	e2.1	2.0
25	7.0	1.2	e2.1	3.0	e2.8	e4.2	13	4.6	8.9	33	e1.9	1.9
26	7.4	e1.6	e2.3	3.0	e2.8	e5.5	11	4.3	4.5	7.5	e1.9	1.9
27	17	e1.7	e2.0	3.0	e2.8	e10	12	2.9	3.9	3.7	e1.9	2.0
28	6.3	e1.6	e2.1	3.0	e2.8	e12	11	2.7	3.6	2.6	1.9	2.2
29	17	1.6	e2.0	3.0	---	e17	9.6	2.6	3.7	2.2	1.9	2.2
30	36	1.6	e2.0	3.2	---	e27	8.3	2.5	3.7	2.1	1.9	2.1
31	8.1	---	e1.9	3.2	---	e26	---	2.6	---	2.1	2.0	---
TOTAL	180.4	279.49	47.99	80.1	79.6	170.9	1186.9	129.3	104.3	141.6	67.7	63.9
MEAN	5.82	9.32	1.55	2.58	2.84	5.51	39.6	4.17	3.48	4.57	2.18	2.13
MAX	36	118	2.3	3.3	3.5	27	115	10	11	33	6.0	2.7
MIN	1.7	.58	.99	1.8	2.5	2.7	8.3	2.5	1.8	1.8	1.8	1.8
AC-FT	358	554	95	159	158	339	2350	256	207	281	134	127
CFSM	.75	1.20	.20	.33	.37	.71	5.09	.54	.45	.59	.28	.27
IN.	.86	1.34	.23	.38	.38	.82	5.68	.62	.50	.68	.32	.31

e Estimated

STREAMS TRIBUTARY TO LAKE SUPERIOR

04024098 DEER CREEK NEAR HOLYOKE, MN--Continued

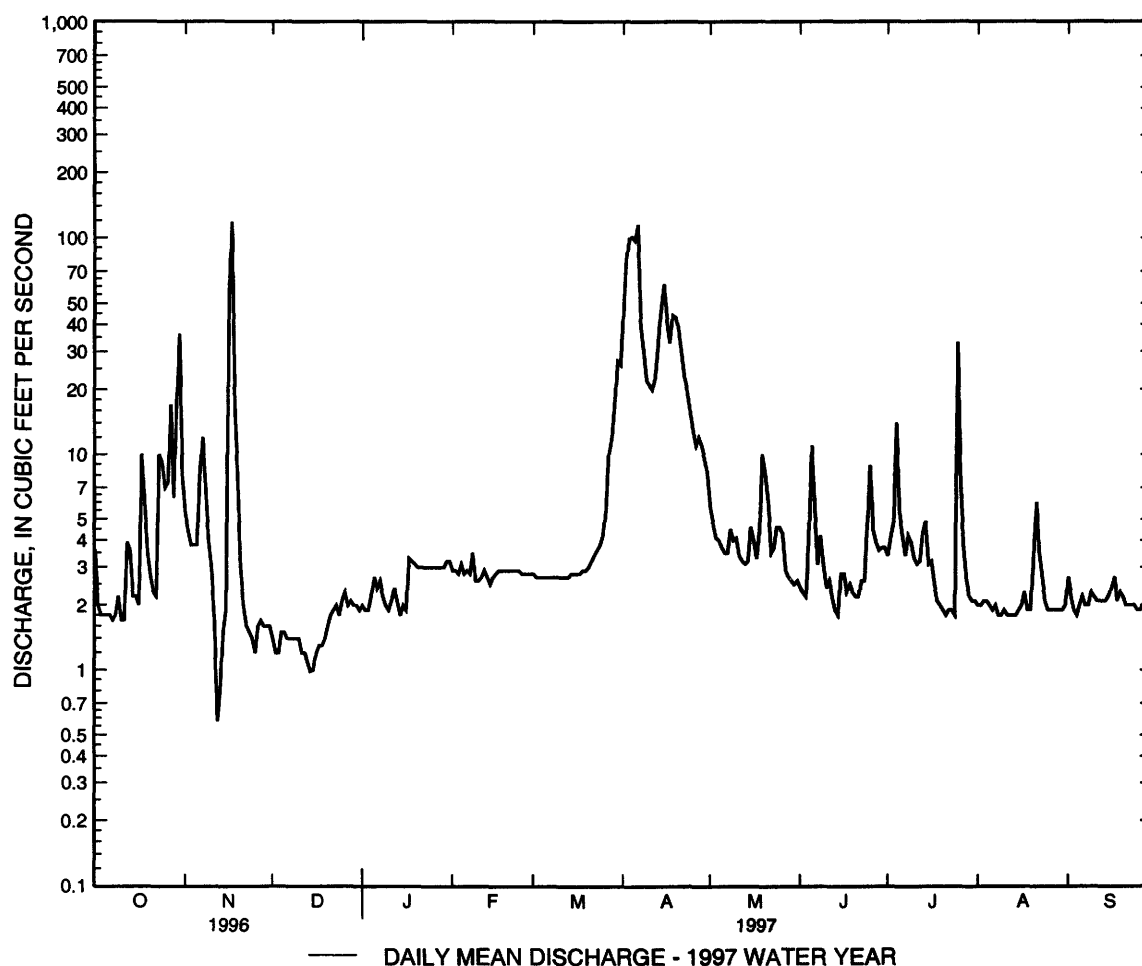
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1976 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	6.76	4.66	2.40	1.90	2.31	8.51	24.3	10.5	7.68	6.69	4.68	7.68
MAX	21.8	12.2	3.86	2.92	5.87	21.5	90.8	24.3	31.4	22.3	36.9	30.4
(WY)	1983	1983	1983	1992	1981	1995	1986	1991	1993	1991	1986	1986
MIN	1.69	1.59	1.31	.97	1.06	2.34	4.11	2.15	1.39	1.50	.89	1.24
(WY)	1988	1977	1977	1979	1979	1986	1977	1980	1995	1988	1982	1993

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1976 - 1997
ANNUAL TOTAL	2605.78	2532.18	
ANNUAL MEAN	7.12	6.94	7.36
HIGHEST ANNUAL MEAN			19.3
LOWEST ANNUAL MEAN			3.65
HIGHEST DAILY MEAN	139	Apr 19	118
LOWEST DAILY MEAN	.58	Nov 12	.58
ANNUAL SEVEN-DAY MINIMUM	1.1	Dec 11	1.1
INSTANTANEOUS PEAK FLOW		332	Nov 16
INSTANTANEOUS PEAK STAGE		16.23	Nov 16
INSTANTANEOUS LOW FLOW		.10	Nov 13
ANNUAL RUNOFF (AC-FT)	5170	5020	5330
ANNUAL RUNOFF (CFSM)	.92	.89	.95
ANNUAL RUNOFF (INCHES)	12.48	12.12	12.87
10 PERCENT EXCEEDS	13	12	14
50 PERCENT EXCEEDS	2.2	2.7	2.6
90 PERCENT EXCEEDS	1.5	1.8	1.5

a From rating curve extended above 1000 ft³/s on basis of flow-thru-culvert computations.

b From floodmark.



RED RIVER OF THE NORTH BASIN

05030500 OTTER TAIL RIVER NEAR ELIZABETH, MN

LOCATION.--Lat 46°22'10", long 96°01'02", in SW¹/₄SE¹/₄ sec. 31, T.134 N., R.42 W., Ottertail County, Hydrologic Unit 09020103, on right bank, 2.5 miles below Taplin Gorge Dam, 5.0 miles above the Diversion Dam, 5.7 miles east of Elizabeth and 6.6 miles northeast of Fergus Falls.

DRAINAGE AREA.--1,230 mi², approximately.

PERIOD OF RECORD.--May 1904 to September 1917, monthly discharge only, published as at German Church near Fergus Falls in WSP 1308. July 1992 to current year.

REVISED RECORD.-- Peak discharge changed to 1080 ft³/s (June 23, 1904), beginning with 1997 record.

GAGE.--Water-stage recorder. Datum of gage is 1,250 ft above mean sea level, from topographic map. Nonrecording gage at same site Nov. 1913 to September 1917 at datum 1,265 ft from topographic map.

REMARKS.--Records good except those for estimated daily discharge, which are fair. Flow regulated by power plant upstream.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	120	140	289	e275	e315	e305	333	894	882	544	573	484
2	115	141	330	e280	e315	e300	340	925	872	595	571	487
3	114	143	358	e290	e310	e290	348	926	827	574	575	480
4	114	144	294	e300	e310	e290	359	928	820	570	572	475
5	113	145	290	e310	e305	e280	403	935	826	568	570	458
6	109	160	295	e310	e305	e290	477	940	818	563	579	448
7	107	162	322	e310	e310	e300	482	960	811	566	575	447
8	106	157	312	e310	e310	e300	482	976	798	574	571	446
9	104	156	298	e310	e310	e300	478	978	783	558	565	440
10	103	155	299	e310	e310	e300	479	986	770	559	558	435
11	102	154	299	e310	e305	e310	491	989	752	564	552	413
12	101	155	307	e310	e300	e320	521	980	711	558	520	412
13	102	157	e315	e310	e300	e330	536	984	702	554	511	412
14	101	162	e320	e320	e305	e340	559	987	695	569	518	409
15	99	169	e320	e325	e310	e355	578	979	706	569	512	400
16	99	175	e315	e330	e320	e365	609	976	697	574	511	375
17	107	182	e315	e330	e325	e380	621	970	689	577	509	358
18	110	170	e310	e330	e330	e385	635	969	678	580	506	358
19	112	189	e290	e340	e330	e390	655	955	653	582	507	328
20	114	210	e280	e350	e330	e395	704	948	651	585	504	388
21	111	223	e270	e358	e320	e395	720	941	649	597	497	366
22	111	235	e265	e350	e320	e390	726	943	641	604	493	350
23	112	232	e260	e350	e315	e390	764	965	639	597	492	343
24	111	244	e255	e345	e315	e385	774	972	628	595	488	334
25	112	282	e255	e335	e310	e385	786	965	589	598	480	324
26	114	331	e255	e335	e320	e377	819	955	581	596	471	319
27	112	313	e250	e330	e320	326	839	940	581	595	468	313
28	113	285	e255	e325	e310	304	868	930	556	590	471	311
29	134	280	e260	e320	---	303	878	921	606	577	476	284
30	145	314	e270	e320	---	307	884	906	581	572	478	279
31	139	---	e275	e320	---	326	---	895	---	573	475	---
TOTAL	3466	5965	9028	9948	8785	10413	18148	29518	21192	17877	16148	11676
MEAN	112	199	291	321	314	336	605	952	706	577	521	389
MAX	145	331	358	358	330	395	884	989	882	604	579	487
MIN	99	140	250	275	300	280	333	894	556	544	468	279
AC-FT	6870	11830	17910	19730	17430	20650	36000	58550	42030	35460	32030	23160
CFSM	.09	.16	.24	.26	.26	.27	.49	.77	.57	.47	.42	.32
IN.	.10	.18	.27	.30	.27	.31	.55	.89	.64	.54	.49	.35

e Estimated

RED RIVER OF THE NORTH BASIN

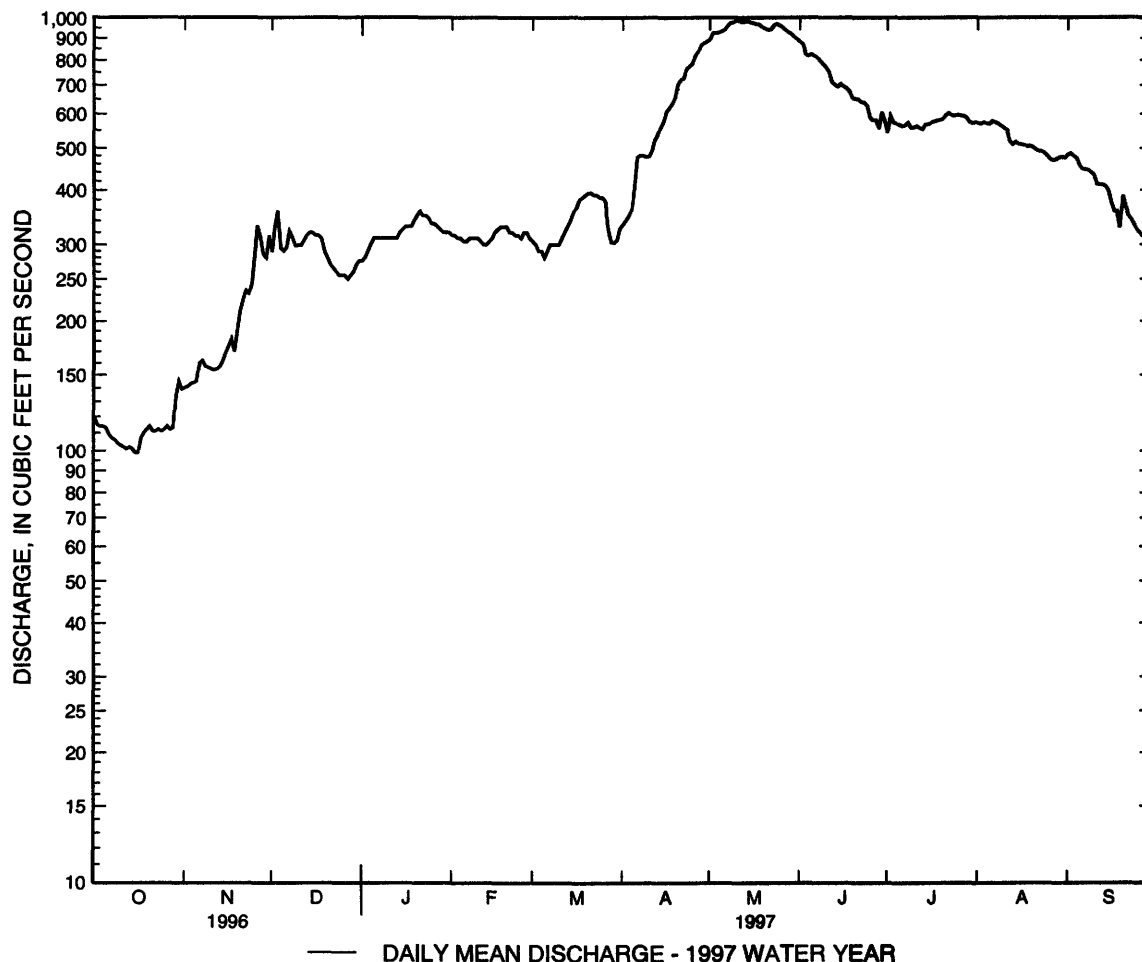
05030500 OTTER TAIL RIVER NEAR ELIZABETH, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	287	292	296	286	314	365	520	733	637	514	381	326
MAX	740	571	489	400	439	443	632	952	754	745	759	817
(WY)	1994	1994	1994	1994	1994	1994	1995	1997	1996	1993	1993	1993
MIN	112	143	141	181	209	314	357	453	454	358	218	134
(WY)	1997	1993	1993	1993	1993	1993	1993	1993	1995	1995	1996	1996

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1992 - 1997
ANNUAL TOTAL	133950	162164	
ANNUAL MEAN	366	444	418
HIGHEST ANNUAL MEAN			495
LOWEST ANNUAL MEAN			349
HIGHEST DAILY MEAN	959	May 20	989
LOWEST DAILY MEAN	99	Oct 15	99
ANNUAL SEVEN-DAY MINIMUM	101	Oct 10	101
INSTANTANEOUS PEAK FLOW		994	994
INSTANTANEOUS PEAK STAGE		8.40	8.40
INSTANTANEOUS LOW FLOW		98	61a
ANNUAL RUNOFF (AC-FT)	265700	321700	302500
ANNUAL RUNOFF (CFSM)	.30	.36	.34
ANNUAL RUNOFF (INCHES)	4.05	4.90	4.61
10 PERCENT EXCEEDS	776	851	743
50 PERCENT EXCEEDS	310	358	343
90 PERCENT EXCEEDS	120	150	160

a Result of regulation.



RED RIVER OF THE NORTH BASIN

05045950 ORWELL LAKE NEAR FERGUS FALLS, MN

LOCATION.--Lat 46°12'55", long 96°10'40", in SW¹/₄ sec. 26, T.132 N., R.44 W., Otter Tail County, Hydrologic Unit 09020103, at dam on Otter Tail River at outlet of Orwell Lake, 7 mi southwest of Fergus Falls.

DRAINAGE AREA.--1,830 mi², approximately.

PERIOD OF RECORD.--March 1953 to current year. Prior to October 1971, published as Orwell Reservoir.

GAGE.--Water-stage recorder. Datum of gage is in mean sea level, adjustment of 1912.

REMARKS.--Reservoir is formed by earth dam with concrete spillway with one taintor gate; storage began in March 1953. Capacity to elevation 1,070 ft (maximum operating stage) is 14,100 acre-ft of which 13,100 acre-ft is controlled storage above elevation 1,048 ft (minimum operating stage). Dead storage is 210 acre-ft. Figures given herein represent total contents. Reservoir is used for flood control and to increase low flow for water supply and pollution abatement.

COOPERATION.--Records were provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 16,920 acre-ft, June 17, 1962, May 23, 1966, elevation, 1,072.38 ft; minimum (after initial filling), 703 acre-ft, Mar. 30, 1997, elevation, 1,048.01 ft; minimum elevation, 1,046.96 ft, Aug. 26, 27, 1953.

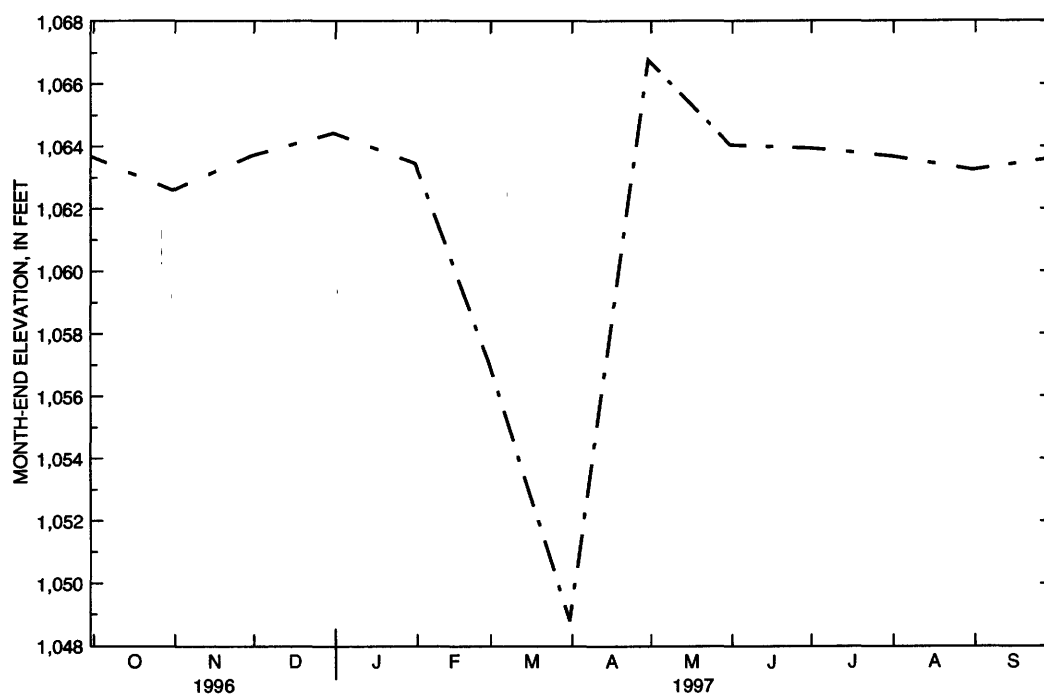
EXTREMES FOR CURRENT YEAR.--Maximum contents, 14,340 acre-ft, Apr. 15, elevation, 1070.27 ft; minimum, 703 acre-ft, Mar. 30, elevation, 1048.01 ft.

MONTH-END ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	1063.67	8050	
Oct. 31	1062.60	7250	-800
Nov. 30	1063.71	8080	+830
Dec. 31	1064.43	8670	+590
CAL YR 1996			+220
Jan. 31	1063.46	7900	-770
Feb. 28	1057.13	3920	-3980
Mar. 31	1048.80	900	-3020
Apr. 30	1066.77	10770	+9870
May 31	1064.05	8340	-2430
June 30	1063.95	8260	-80
July 31	1063.69	8070	-190
Aug. 31	1063.25	7740	-330
Sept. 30	1063.62	8020	+280
WTR YR 1997			-30

RED RIVER OF THE NORTH BASIN

05045950 ORWELL LAKE NEAR FERGUS FALLS, MN--Continued



RED RIVER OF THE NORTH BASIN

05046000 OTTER TAIL RIVER BELOW ORWELL DAM, NEAR FERGUS FALLS, MN

LOCATION.--Lat 46°12'35", long 96°11'05", in NE¹/₄ sec. 34, T.132 N., R.44 W., Otter Tail County, Hydrologic Unit 09020103, on left bank 0.7 mi downstream from Orwell Dam, 6.1 mi downstream from Dayton Hollow Dam, 8 mi southwest of Fergus Falls, and 11.1 mi downstream from Pelican River.

DRAINAGE AREA.--1,740 mi².

PERIOD OF RECORD.--October 1930 to current year. Prior to October 1952, published as Otter Tail River below Pelican River, near Fergus Falls. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 785: 1934(M). WSP 1208: 1947(M). WSP 1308: 1931(M).

GAGE.--Water-stage recorder. Datum of gage is 1,029.65 ft above sea level, adjustment of 1912 (levels by U.S. Army Corps of Engineers) Oct. 11, 1930 to Nov. 17, 1933, at same site at datum 2.00 ft higher; Nov. 18, 1933 to Mar. 21, 1953, at site 6.1 mi upstream at datum 40.30 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Flow regulated by Orwell Lake (station 0504595C) beginning Mar. 21, 1953 and power plant upstream.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	309	324	316	391	504	533	946	1370	1330	819	774	675
2	310	319	316	388	490	528	1150	1360	1280	918	771	672
3	345	316	262	401	483	518	1110	1360	1210	975	771	704
4	389	316	287	437	483	517	856	1360	1210	903	775	728
5	310	277	477	460	486	510	671	1360	1210	903	775	723
6	231	251	451	457	471	509	716	1360	1210	903	776	720
7	219	253	515	450	471	496	755	1360	1220	902	777	710
8	161	283	516	439	491	497	780	1370	1220	899	777	664
9	132	302	481	451	477	480	795	1370	1130	896	777	618
10	127	301	446	647	522	473	808	1370	1060	892	777	339
11	128	301	446	682	567	476	914	1370	1070	854	773	145
12	131	272	446	584	606	492	1170	1370	1100	821	771	430
13	131	209	447	520	564	519	1260	1380	1140	821	771	702
14	138	183	446	483	591	559	1340	1380	1140	822	735	696
15	172	184	446	506	623	584	1390	1380	1130	824	699	621
16	227	185	447	635	620	572	1480	1380	1030	822	697	577
17	260	186	441	605	594	558	1460	1380	968	826	693	578
18	257	227	440	606	541	580	1460	1380	972	827	693	545
19	251	292	410	562	552	593	1450	1380	967	827	693	502
20	225	316	377	535	536	606	1440	1380	1010	827	693	501
21	210	316	377	497	534	640	1430	1420	1030	827	691	505
22	226	316	377	528	526	652	1430	1480	1020	827	689	541
23	244	316	345	516	523	630	1420	1500	1010	827	697	561
24	239	316	322	510	518	590	1410	1500	1000	827	698	501
25	208	316	312	600	515	620	1410	1500	916	832	680	501
26	180	316	311	530	536	624	1390	1490	807	832	649	501
27	179	316	351	518	549	609	1390	1490	785	831	665	501
28	179	316	391	546	540	649	1390	1480	821	830	681	502
29	183	316	393	572	---	709	1380	1470	817	831	681	502
30	266	316	391	587	---	658	1380	1400	815	798	678	502
31	324	---	391	525	---	726	---	1330	---	773	675	---
TOTAL	6891	8457	12374	16168	14913	17707	35981	43480	31628	26316	22452	16967
MEAN	222	282	399	522	533	571	1199	1403	1054	849	724	566
MAX	389	324	516	682	623	726	1480	1500	1330	975	777	728
MIN	127	183	262	388	471	473	671	1330	785	773	649	145
AC-FT	13670	16770	24540	32070	29580	35120	71370	86240	62730	52200	44530	33650
CFSM	.13	.16	.23	.30	.31	.33	.69	.81	.61	.49	.42	.33

RED RIVER OF THE NORTH BASIN

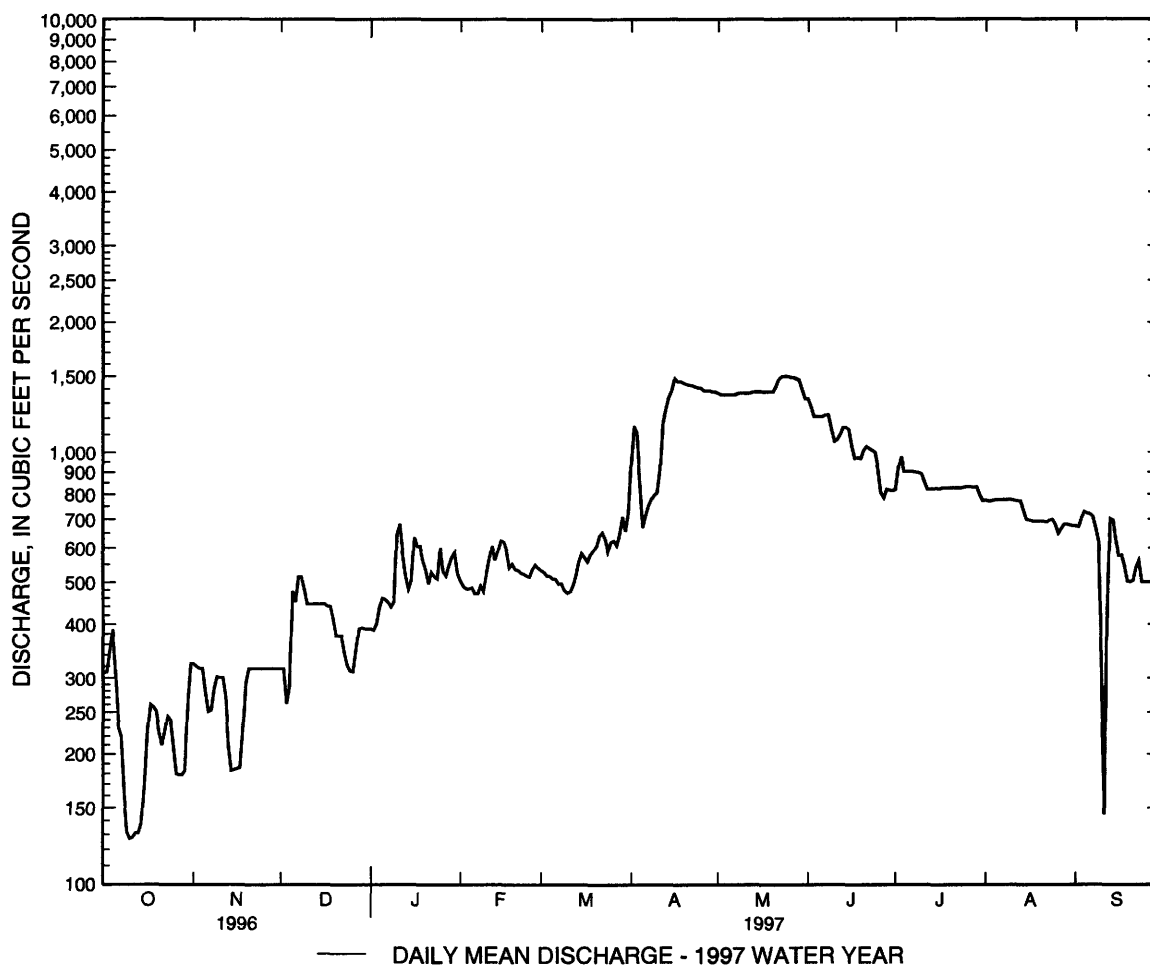
05046000 OTTER TAIL RIVER BELOW ORWELL DAM, NEAR FERGUS FALLS, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	238	246	236	229	233	316	480	585	570	416	283	239
MAX	973	831	706	603	647	724	1199	1427	1425	1246	1080	1026
(WY)	1994	1986	1987	1986	1994	1994	1997	1986	1986	1953	1985	1993
MIN	9.15	8.42	8.10	15.1	10.8	23.5	39.5	14.1	14.2	12.8	11.5	7.99
(WY)	1977	1977	1977	1937	1935	1937	1934	1977	1934	1936	1934	1934

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1931 - 1957
ANNUAL TOTAL	191265	253334	
ANNUAL MEAN	523	694	
HIGHEST ANNUAL MEAN			842
LOWEST ANNUAL MEAN			20.4
HIGHEST DAILY MEAN	1260	May 26	1500 ^a May 23
LOWEST DAILY MEAN	127	Oct 10	127 Oct 10
ANNUAL SEVEN-DAY MINIMUM	135	Oct 8	135 Oct 8
INSTANTANEOUS PEAK FLOW		1500	May 22
INSTANTANEOUS PEAK STAGE		4.63	May 22
INSTANTANEOUS LOW FLOW		127	Oct 10
ANNUAL RUNOFF (AC-FT)	379400	502500	246000
ANNUAL RUNOFF (CFSM)	.30	.40	.20
10 PERCENT EXCEEDS	1070	1370	743
50 PERCENT EXCEEDS	420	606	266
90 PERCENT EXCEEDS	213	275	33

a Affected in part by regulation.



RED RIVER OF THE NORTH BASIN

05050000 BOIS DE SIOUX RIVER NEAR WHITE ROCK, SD

LOCATION.--Lat 45°51'45", long 96°34'25", in SW¹/₄SW¹/₄ sec. 27, T.128 N., R.47 W., Roberts County, Hydrologic Unit 09020101, on Sisseton Indian Reservation, on left bank just downstream from Big Slough Outlet, 300 ft downstream from White Rock Dam, 4 mi south of White Rock, SD and 5 mi northwest of Wheaton.

DRAINAGE AREA.--1,160 mi², approximately.

PERIOD OF RECORD.--October 1941 to current year.

GAGE.--Water-stage recorder. Datum of gage is 960.00 ft, adjustment of 1912 (levels by U.S. Army Corps of Engineers). Prior to Jan. 14, 1943, nonrecording gage at same site at datum 0.11 ft lower. Jan. 15, 1943 to Sept. 30, 1963, water-stage recorder at same site at datum 0.11 ft lower.

REMARKS.--Records fair, except those for estimated period which are poor. Flow regulated by Lake Traverse-Bois de Sioux Flood Control and Water Conservation project.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.15	8.5	e8.8	e21	e64	e320	e440	e2490	1070	102	1.3	2.7
2	.13	5.7	e9.2	e22	e65	e320	e520	e1980	971	108	1.9	2.6
3	.19	4.3	e9.6	e23	e65	e315	e530	e1940	918	138	1.3	2.4
4	.28	4.3	e9.8	e24	e66	e310	e540	e1840	1040	191	.86	2.3
5	.49	4.1	e10	e25	e66	e300	e545	e1780	1030	190	.75	1.9
6	.22	5.1	e10	e27	e67	e355	e550	e1750	1010	187	15	1.7
7	.18	4.8	e10	e29	e67	e365	e560	e1720	995	165	15	1.2
8	.16	4.3	e10	e29	e68	e365	e570	e1630	978	133	14	1.2
9	.15	4.2	e10	e32	e68	e365	e580	e1560	960	104	6.1	.89
10	.14	6.0	e10	e33	e69	e360	e2300	e1520	939	77	3.5	.65
11	.25	4.1	e11	e35	e70	e350	e4560	e1480	918	56	2.8	.67
12	.28	3.6	e11	e36	e71	e340	e5160	e1450	898	19	1.5	1.5
13	.40	3.1	e11	e38	e72	e360	e5620	e1430	803	18	1.1	.39
14	.41	3.0	e11	e40	e73	e400	e6280	e1430	696	18	.97	.23
15	.34	2.9	e12	e41	e132	e415	e7220	1400	695	19	1.8	.52
16	.29	3.1	e13	e44	e135	e410	e7710	1390	609	16	1.4	1.1
17	1.3	3.5	e13	e45	e140	e405	e7630	1370	593	15	1.1	.99
18	2.9	3.1	e14	e47	e140	e400	e7520	1370	453	13	1.7	.54
19	3.0	3.6	e14	e48	e180	e395	e7450	1330	380	12	7.9	.54
20	2.7	4.1	e14	e50	e185	e320	e7300	1340	372	14	17	.61
21	2.3	4.8	e15	e51	e245	e325	e6550	1360	363	10	17	.61
22	1.7	4.9	e15	e52	e250	e240	e5750	1280	334	5.0	15	.47
23	1.5	5.6	e15	e53	e255	e240	e4830	1150	284	4.1	11	.55
24	1.3	5.7	e16	e54	e260	e240	e4250	1130	238	2.9	8.2	.81
25	1.2	6.1	e16	e55	e320	e240	e3740	1120	232	4.2	6.9	.42
26	1.5	6.4	e17	e57	e320	e240	e3560	1110	165	4.3	3.4	.46
27	3.6	6.4	e17	e58	e320	e240	e3240	1100	103	3.5	1.9	.55
28	2.4	6.6	e18	e60	e320	e240	e3100	1090	104	3.0	2.2	.84
29	3.6	7.1	e19	e61	---	e240	e3000	1090	104	2.3	3.3	.33
30	16	e8.0	e20	e62	---	e350	e2820	1080	103	4.8	2.6	.21
31	10	---	e20	e63	---	e340	---	1080	---	6.9	2.2	---
TOTAL	59.06	147.0	409.4	1315	4153	10105	114425	44790	18358	1646.0	170.68	29.88
MEAN	1.91	4.90	13.2	42.4	148	326	3814	1445	612	53.1	5.51	1.00
MAX	16	8.5	20	63	320	415	7710	2490	1070	191	17	2.7
MIN	.13	2.9	8.8	21	64	240	440	1080	103	2.3	.79	.21
AC-FT	117	292	812	2610	8240	20040	227000	88840	36410	3260	339	59
CFSM	.00	.00	.01	.04	.13	.28	3.29	1.25	.53	.05	.00	.00
IN.	.00	.00	.01	.04	.13	.32	3.67	1.44	.59	.05	.01	.00

e Estimated

RED RIVER OF THE NORTH BASIN

05050000 BOIS DE SIOUX RIVER NEAR WHITE ROCK, SD--Continued

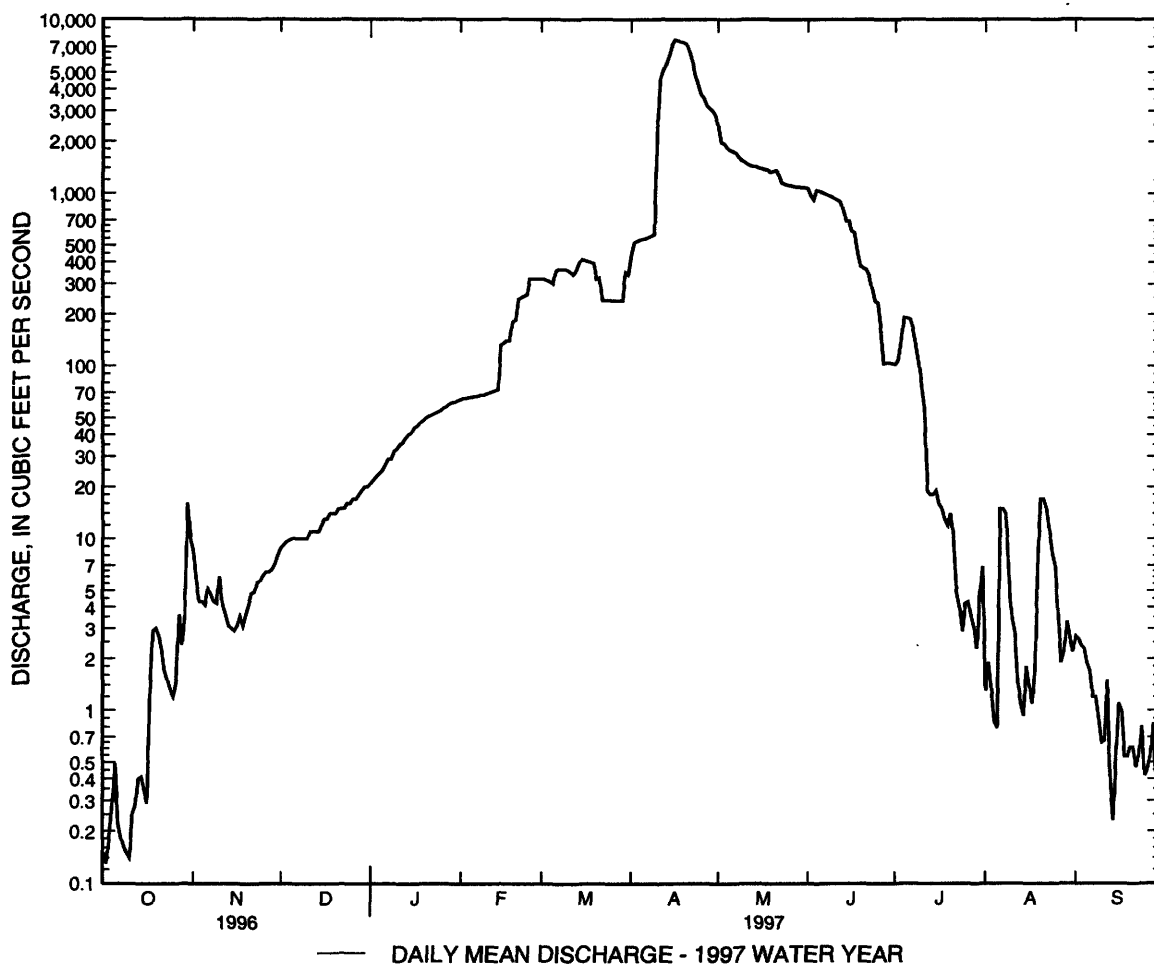
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	30.5	16.9	5.40	3.45	6.16	48.0	310	307	249	161	71.2	35.2
MAX	535	307	57.5	42.4	148	628	3814	1445	1103	1035	1182	1062
(WY)	1994	1996	1985	1997	1997	1996	1997	1997	1986	1962	1993	1993
MIN	.000	.000	.000	.000	.000	.000	.000	.23	.010	.000	.000	.000
(WY)	1942	1942	1942	1942	1942	1942	1942	1977	1977	1961	1970	1960

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1942 - 1997
ANNUAL TOTAL	74450.27	195608.02	
ANNUAL MEAN	203	536	104 ^a
HIGHEST ANNUAL MEAN			536
LOWEST ANNUAL MEAN			.38
HIGHEST DAILY MEAN	1210	May 18	7710
LOWEST DAILY MEAN	.13	Oct 2	.13
ANNUAL SEVEN-DAY MINIMUM	.19	Sep 27	.20
INSTANTANEOUS PEAK FLOW		8750 ^c	Apr 20
INSTANTANEOUS PEAK STAGE		16.90 ^c	Apr 20
INSTANTANEOUS LOW FLOW		.12	Oct 2
ANNUAL RUNOFF (AC-FT)	147700	388000	75220
ANNUAL RUNOFF (CFSM)	.18	.46	.090
ANNUAL RUNOFF (INCHES)	2.39	6.27	1.22
10 PERCENT EXCEEDS	727	1390	338
50 PERCENT EXCEEDS	9.6	33	2.6
90 PERCENT EXCEEDS	.42	.88	.00

a Median of annual mean discharges is 56 ft³/s.

b Many days, several years.

c Discharge determined based on observer readings, which are 'fair'. Some evidence suggests peak occurred on Apr. 16 (discharge, 7930 ft³/s).

RED RIVER OF THE NORTH BASIN

05051300 BOIS DE SIOUX RIVER NEAR DORAN, MN

LOCATION.--Lat 46°09'08", long 96°34'44", in NE 1/4 NE 1/4 sec. 21, T.131 N., R.47 W., Wilkin County, MN, Hydrologic Unit 09020101, on right bank, 10 ft downstream from bridge on County Highway 6, 3 miles downstream from Rabbit River, 4.3 mi southwest of Doran, MN.

DRAINAGE AREA.--1,880 mi² (approximately).

PERIOD OF RECORD.--October 12, 1989 to current year.

GAGE.--Water-stage recorder. Datum of gage is 943.90 ft above mean sea level (elevation data obtained from Wilkin County Highway Engineer).

REMARKS.--Records good except for estimated daily discharges, which are fair to poor. Flow regulated by Lake Traverse-Bois de Sioux Flood Control and Wildlife Conservation project near White Rock, S.D.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.28	5.3	8.5	e21	e67	e320	e680	4080	1130	108	4.0	8.2
2	.24	5.1	7.4	e22	e68	e320	e950	3900	1130	149	4.8	8.5
3	.24	3.9	7.6	e23	e68	e320	e1300	3620	992	168	5.6	8.4
4	.22	3.2	9.6	e24	e68	e315	e1800	3350	1040	206	5.4	8.0
5	.19	2.6	e10	e25	e68	e310	e2400	3080	1080	224	4.5	7.6
6	.16	2.3	e11	e27	e68	e300	e3300	2830	1100	204	5.1	8.9
7	.16	2.1	e11	e29	e69	e355	e4200	2600	1080	197	4.7	9.7
8	.18	2.0	e11	e29	e69	e365	e5300	2340	1050	165	4.7	10
9	.19	2.2	e11	e32	e69	e365	e5990	2110	1020	136	6.3	10
10	.18	2.4	e11	e33	e70	e365	e6200	1950	998	107	6.2	12
11	.17	1.9	e11	e35	e70	e360	e6800	1770	968	82	6.1	12
12	.14	1.7	e11	e36	e71	e350	e7640	1650	939	69	5.0	11
13	.12	1.6	e11	e38	e72	e340	8150	1600	903	26	4.7	9.8
14	.21	1.5	e11	e40	e73	e360	9310	1530	785	11	4.4	9.3
15	.20	1.4	e12	e41	e74	e400	11300	1500	730	7.4	4.7	11
16	.14	1.4	e13	e44	e132	e415	11500	1480	685	6.6	5.3	9.4
17	.25	2.6	e13	e46	e135	e410	11000	1460	568	6.1	5.5	8.3
18	.34	1.6	e14	e48	e140	e405	9920	1420	507	5.6	6.8	7.3
19	.38	1.5	e14	e50	e140	e400	8320	1390	415	5.2	8.8	7.0
20	.82	2.0	e14	e52	e180	e395	7440	1380	400	4.7	9.4	7.5
21	1.4	2.4	e15	e54	e185	e320	7090	1380	379	4.4	10	7.6
22	1.3	2.3	e15	e56	e245	e325	6670	1400	357	4.0	13	7.7
23	1.2	2.5	e15	e57	e250	e240	6230	1350	350	3.8	23	6.9
24	1.1	3.0	e16	e58	e255	e240	5860	1270	288	3.9	22	2.5
25	.94	3.5	e16	e60	e260	e240	5420	1240	280	4.2	16	1.6
26	.95	4.1	e17	e61	e320	e240	5190	1220	260	4.3	11	1.6
27	.97	4.6	e17	e62	e320	e241	4820	1180	165	4.1	8.2	1.2
28	.89	4.8	e18	e63	e320	e241	4600	1170	120	3.9	6.9	1.4
29	1.4	5.1	e19	e64	---	e241	4450	1150	115	3.8	7.1	1.3
30	2.8	7.9	e20	e65	---	e350	4240	1140	108	4.1	7.4	.87
31	3.1	---	e20	e66	---	e480	---	1140	---	3.9	7.9	---
TOTAL	20.86	88.5	410.1	1361	3926	10328	178070	58680	19942	1932.0	244.5	216.57
MEAN	.67	2.95	13.2	43.9	140	333	5936	1893	665	62.3	7.89	7.22
MAX	3.1	7.9	20	66	320	480	11500	4080	1130	224	23	12
MIN	.12	1.4	7.4	21	67	240	680	1140	108	3.8	4.0	.87
AC-FT	41	176	813	2700	7790	20490	353200	116400	39550	3830	485	430
CFSM	.00	.00	.01	.02	.07	.18	3.16	1.01	.35	.03	.00	.00
IN.	.00	.00	.01	.03	.08	.20	3.52	1.16	.39	.04	.00	.00

e Estimated

RED RIVER OF THE NORTH BASIN

05051300 BOIS DE SIOUX RIVER NEAR DORAN, MN--Continued

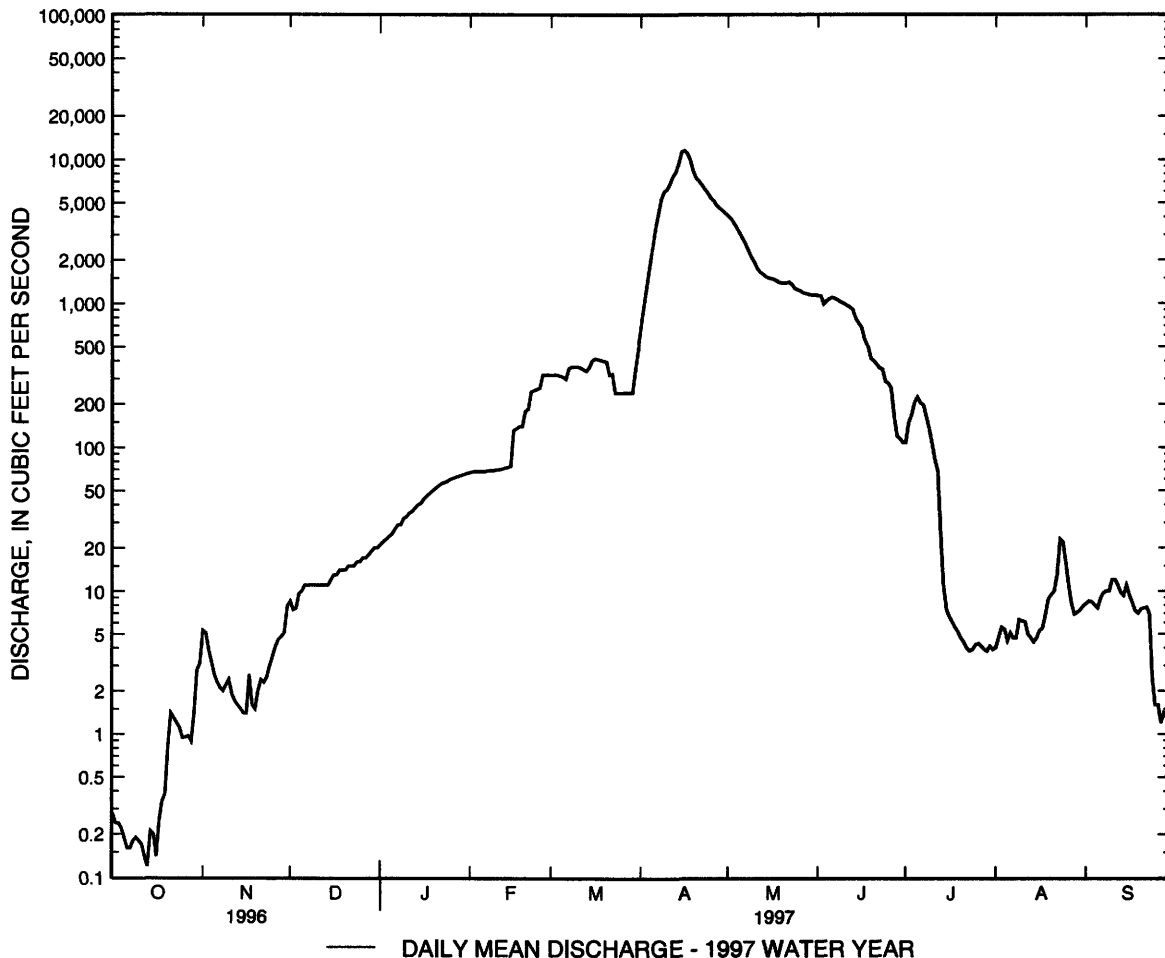
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1990 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	136	64.5	8.60	8.96	23.6	476	1491	791	394	469	237	211
MAX	592	465	25.6	43.9	140	1757	5936	1893	749	1477	1486	1244
(WY)	1994	1996	1996	1997	1997	1995	1997	1997	1995	1993	1993	1993
MIN	.026	1.97	.65	.077	.000	25.5	12.6	11.8	12.6	4.37	.000	.000
(WY)	1991	1991	1991	1991	1990	1990	1990	1990	1990	1990	1990	1990

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1990 - 1997
ANNUAL TOTAL	122656	275219	
ANNUAL MEAN	335	754	360
HIGHEST ANNUAL MEAN			754
LOWEST ANNUAL MEAN			8.77
HIGHEST DAILY MEAN	3580	May 19	11500
LOWEST DAILY MEAN	.12	Oct 13	.12
ANNUAL SEVEN-DAY MINIMUM	.16	Oct 7	.16
INSTANTANEOUS PEAK FLOW		12300	12300
INSTANTANEOUS PEAK STAGE		24.42	24.42
ANNUAL RUNOFF (AC-FT)	243300	545900	260700
ANNUAL RUNOFF (CFSM)	.18	.40	.19
ANNUAL RUNOFF (INCHES)	2.43	5.45	2.60
10 PERCENT EXCEEDS	1240	1860	1250
50 PERCENT EXCEEDS	11	35	12
90 PERCENT EXCEEDS	.41	1.5	.26

a Many days, several years; affected by regulation.

b Result of regulation.



RED RIVER OF THE NORTH BASIN
05051300 BOIS DE SIOUX RIVER NEAR DORAN, MN--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1994-95, May to September 1997.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN DEMAND, BIO- CHEM- ICAL, 5 DAY (MG/L) (00310)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM TOTAL RECOVER -ABLE (MG/L) (00918)	MAGNE- SIUM, TOTAL RECOVER -ABLE (MG/L) (00021)
MAY 20...	0930	695	8.1	11.5	8.2	3.0	151	580	K31	68	36
JUN 10...	0900	802	7.3	21.0	6.7	2.0	183	K18	K180	87	46
JUL 22...	0945	1370	7.4	24.5	5.1	--	--	160	180	--	--
AUG 12...	1000	1350	7.3	20.5	7.1	3.0	277	1300	250	130	90
SEP 16...	0945	1290	7.6	20.5	7.8	3.0	326	560	370	110	76

	SODIUM, TOTAL RECOVER DATE (MG/L) (00923)	POTAS- SIUM, TOTAL RECOVER -ABLE (MG/L) (00939)	SULFATE DIS- SOLVED -ABLE (AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L(MG/L AS P) (00666)
MAY 20...	18	7.3	210	9.4	0.030	0.075	0.95	1.0	1.0	0.159	0.128
JUN 10...	23	8.3	280	11	0.020	0.055	0.85	0.91	0.93	0.250	0.186
AUG 12...	60	9.5	550	14	<0.020	<0.010	1.5	1.5	1.5	0.239	0.179
SEP 16...	48	11.3	400	22	<0.020	<0.010	1.4	1.4	1.4	0.232	0.179

RED RIVER OF THE NORTH BASIN

05051300 BOIS DE SIOUX RIVER NEAR DORAN, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	PHOS- PHORUS ORGANIC TOTAL (MG/L AS P) (00670)	ALUMI- NUM, TOTAL RECOVER -ABLE (UG/L) (01104)	ANTI- MONY, TOTAL RECOVER (UG/L AS SB) (01097)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOVER -ABLE (UG/L) (01009)	BERYL- LIUM TOTAL RECOVER -ABLE (UG/L) (00998)	BORON, TOTAL RECOVER -ABLE (UG/L) (00999)	CADMIUM TOTAL RECOVER -ABLE (UG/L) (01113)	CHRO- MIUM, TOTAL RECOVER -ABLE (UG/L) (01118)	COPPER, TOTAL RECOVER -ABLE (UG/L) (01119)
MAY 20...	0.16	380	0.8	7	54	<0.2	200	<0.02	1	3
JUN 10...	0.25	1200	0.4	5	74	<0.2	100	0.1	2	5
JUL 22...	--	--	--	--	--	--	--	--	--	--
AUG 12...	0.24	420	<1	9	85	<1	300	<1	1	6
SEP 16...	0.23	1200	2	10	90	<1	200	<1	3	7

DATE	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOVER -ABLE (UG/L) (01114)	MANGAN- ESE TOTAL RECOVER -ABLE (UG/L) (01123)	NICKEL, TOTAL RECOVER -ABLE (UG/L) (01074)	SELE- NIUM, TOTAL RECOVER (UG/L AS SE) (01147)	SILVER, TOTAL RECOVER -ABLE (UG/L) (01079)	THAL- LIUM TOTAL RECOV- ERABLE (UG/L AS TL) (01128)	ZINC, TOTAL RECOVER -ABLE (UG/L) (01094)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAY 20...	530	2	50	5	7	<0.04	<0.03	4	32	99
JUN 10...	1800	2	180	8	1	0.22	<0.03	10	105	99
AUG 12...	670	<1	270	9	<1	<1	<1	20	--	--
SEP 16...	1600	5	320	9	<1	<1	<1	30	--	--

RED RIVER OF THE NORTH BASIN

05051500 RED RIVER OF THE NORTH AT WAHPETON, N.D.

LOCATION.--Lat 46°15'55", long 96°35'40", in NE¹/₄ sec. 8, T.132 N., R.47 W., Richland County, Hydrologic Unit 09020104, on left bank in Wahpeton, 800 ft downstream from confluence of Bois de Sioux and Otter Tail Rivers, and at mile 548.6.

DRAINAGE AREA.--4,010 mi², approximately.

PERIOD OF RECORD.--April 1942 to October 1942, March 1943 to current year. Gage-height records collected in this vicinity since 1917 are contained in report of the National Weather Service.

GAGE.--Water-stage recorder and concrete and wooden dam. Datum of gage is 942.97 ft above sea level. Prior to Aug. 6, 1943, National Weather Service nonrecording gage 800 ft upstream, converted to present datum. Aug. 6, 1943 to Oct. 27, 1950, nonrecording gage at present site and datum.

REMARKS.--Records fair. Flow regulated by Orwell Reservoir, capacity, 14,100 acre-ft at elevation 1,070 ft above sea level, adjustment of 1912; Lake Traverse, capacity, 137,000 acre-ft, available for flood control; numerous other controlled lakes and ponds, and several power plants.

EXTREMES OUTSIDE PERIOD OF RECORD.--A stage of 17.0 ft, discharge, 10,500 ft³/s, occurred in the spring of 1897.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	265	386	e310	e430	e600	e900	e1400	5850	2410	1260	795	711
2	292	378	e300	e430	e610	e900	e2000	5590	2370	1290	804	714
3	299	392	e290	e430	e610	e900	e3000	5310	2290	1380	812	708
4	311	333	e280	e430	e610	e900	e5800	4970	2170	1500	811	725
5	363	323	e260	e400	e610	e900	e9000	4690	2240	1510	809	756
6	328	292	e400	e350	e610	e900	e10000	4420	2280	1500	827	755
7	252	259	e420	e370	e610	e900	e9000	4200	2250	e1540	808	754
8	223	254	e450	e400	e610	e900	e7500	3940	2210	e1300	799	768
9	189	273	e500	e430	e610	e900	e7200	3660	2170	e1200	811	728
10	137	329	e500	e430	e610	e900	e7000	3420	2120	e1100	811	654
11	115	353	e480	e390	e610	e900	e8000	3210	2000	e1080	804	e390
12	108	309	e470	e370	e615	e900	e8800	3050	1960	1050	800	e200
13	107	316	e450	e400	e650	e900	10000	2960	1940	990	798	e350
14	102	319	e440	e440	e680	e910	11300	2910	1890	937	793	e500
15	100	214	e430	e480	e700	e910	12700	2830	1850	898	769	e600
16	119	220	e420	e440	e720	e910	12500	2810	1790	885	723	e630
17	223	262	e440	e420	e750	e920	12300	2780	1660	882	717	590
18	262	222	e380	e420	e780	e930	12200	2750	1490	883	709	586
19	251	e250	e320	e470	e800	e950	12000	2710	1430	879	728	559
20	242	e300	e400	e500	e800	e950	11800	2700	1440	871	738	505
21	227	e330	e440	e520	e820	e950	11400	2680	1430	871	738	504
22	211	e320	e430	e530	e840	e950	11000	2710	1410	864	740	506
23	214	e310	e420	e530	e860	e950	10600	2780	1420	860	752	549
24	306	e300	e400	e530	e880	e950	10000	2740	1390	861	767	589
25	288	e290	e330	e530	e900	e980	9190	2670	1380	868	758	523
26	231	e300	e350	e530	e900	e980	8330	2620	1380	868	736	521
27	195	e300	e360	e530	e900	e980	7600	2590	1260	860	691	515
28	182	e320	e380	e530	e900	e980	7050	2560	1190	859	702	525
29	204	e320	e400	e530	---	e1000	6610	2540	1250	855	732	519
30	229	e320	e450	e550	---	e1100	6220	2520	1250	852	725	523
31	229	---	e440	e600	---	e1200	---	2490	---	826	717	---
TOTAL	6804	9094	12340	14340	20195	29200	261500	103660	53320	32379	23724	17457
MEAN	219	303	398	463	721	942	8717	3344	1777	1044	765	582
MAX	363	392	500	600	900	1200	12700	5850	2410	1540	827	768
MIN	100	214	260	350	600	900	1400	2490	1190	826	691	200
AC-FT	13500	18040	24480	28440	40060	57920	518700	205600	105800	64220	47060	34630

e Estimated

RED RIVER OF THE NORTH BASIN

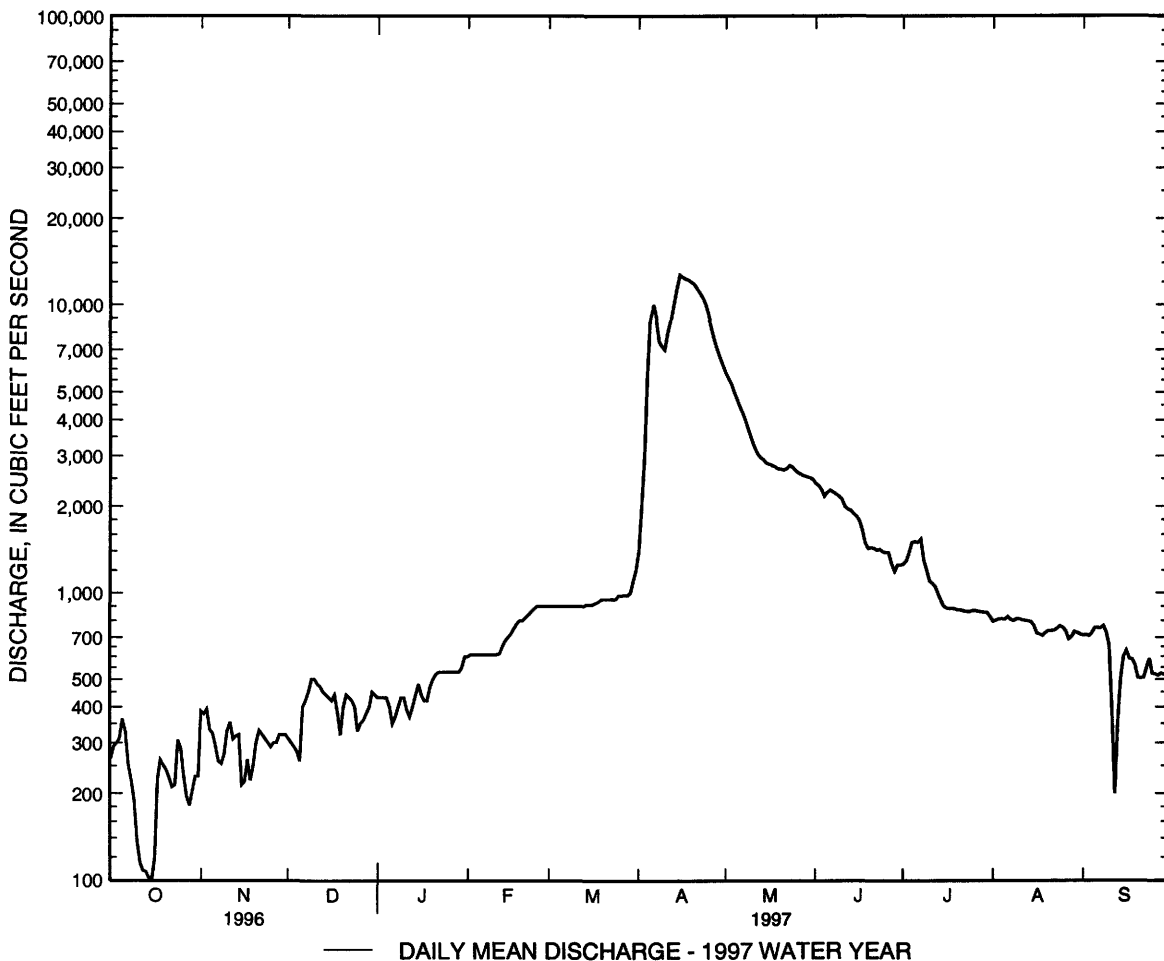
05051500 RED RIVER OF THE NORTH AT WAHPETON, ND--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	329	307	276	269	284	670	1422	1115	1055	780	422	334
MAX	1599	952	820	678	721	2629	8717	3344	2675	2787	2496	2148
(WY)	1994	1987	1987	1986	1997	1995	1997	1997	1962	1993	1993	1993
MIN	5.72	7.40	6.60	8.81	18.0	84.3	138	22.5	90.0	65.6	53.5	218
(WY)	1977	1977	1977	1977	1977	1977	1977	1977	1977	1977	1977	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1942 - 1997
ANNUAL TOTAL	349449	584013	
ANNUAL MEAN	955	1600	601
HIGHEST ANNUAL MEAN			1600
LOWEST ANNUAL MEAN			54.0
HIGHEST DAILY MEAN	5320	May 19	12700
LOWEST DAILY MEAN	85	Sep 18	100
ANNUAL SEVEN-DAY MINIMUM	113	Oct 10	113
INSTANTANEOUS PEAK FLOW		12800	Apr 15
INSTANTANEOUS PEAK STAGE		19.42 ^a	Apr 6
INSTANTANEOUS LOW FLOW			1.7
ANNUAL RUNOFF (AC-FT)	693100	1158000	435700
10 PERCENT EXCEEDS	2460	3520	1450
50 PERCENT EXCEEDS	460	756	368
90 PERCENT EXCEEDS	224	289	105

a From floodmark, backwater from ice.



RED RIVER OF THE NORTH BASIN

05051500 RED RIVER OF THE NORTH AT WAHPETON, ND--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water year 1972 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)
OCT 02...	1020	291	469	--	4.5	12.0	--	--	--	--
NOV 06...	1615	266	643	--	3.0	4.5	--	--	--	--
JAN 13...	1630	400	570	--	-5.0	0.0	--	--	--	--
FEB 05...	1100	608	719	--	-0.5	0.5	--	--	--	--
MAR 19...	1155	949	963	--	5.0	0.5	--	--	--	--
APR 22...	1400	10800	530	7.6	14.0	13.5	200	114	45	21
25...	1815	9240	438	--	18.0	15.0	--	--	--	--
MAY 08...	1500	4070	--	--	7.5	12.5	--	--	--	--
14...	1650	2870	557	--	10.0	11.0	--	--	--	--

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS DIS- SOLVED (TONS PER AC-FT) (70303)
APR 22...	9.5	9	0.3	4.3	95	9.0	0.20	253	284	0.39

DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
APR 22...	8280	3	20	<1.0	20	10	1.0	1.0	<1	210

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RED RIVER OF THE NORTH BASIN

05051522 RED RIVER OF THE NORTH AT HICKSON, ND

LOCATION.--Lat 46°39'35", long 96°47'44", in SW¹/₄ sec. 19, T.137 N., R.48 W., Clay County, MN, Hydrologic Unit 09020104, on right bank 60 ft downstream from bridge on township road, and 1 mi southeast of Hickson, ND.

DRAINAGE AREA.--4,300 mi², approximately.

PERIOD OF RECORD.--October 1975 to current year.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 877.06 ft above sea level.

REMARKS.--Records good except those for periods of estimated daily discharges, which are fair. Flow regulated by Orwell Reservoir, capacity, 14,100 acre-ft at 1,070 ft above sea level, adjustment of 1912; Lake Traverse, capacity, 137,000 acre-ft, available for flood control, numerous other controlled lakes and ponds, and several power plants.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	255	210	e323	e375	e537	e969	e1280	7240	2530	1390	797	718
2	250	182	e317	e389	e547	e986	e2320	6890	2490	1360	764	692
3	257	295	e307	e375	e565	e1000	e3180	6570	2420	1290	752	677
4	279	434	e302	e375	e593	e1010	e4420	6270	2340	1250	764	677
5	291	459	e297	e373	e592	e992	e5660	5950	2230	1280	762	682
6	316	374	e287	e344	e574	e957	e8210	5610	2170	1290	781	707
7	347	341	e287	e328	e559	e918	e10800	5340	2210	1250	783	722
8	309	302	e397	e314	e544	e887	e12300	5090	2230	1230	772	739
9	251	271	e455	e319	e554	e892	e12500	4830	2200	1230	752	740
10	225	254	e514	e349	e546	e903	12400	4480	2160	1180	751	730
11	199	178	e553	e375	e545	e897	12400	4140	2110	1140	757	673
12	170	157	e531	e386	e539	e880	12300	3840	2030	1100	754	609
13	155	189	e475	e328	e543	e866	12500	3570	1940	1060	750	371
14	150	250	e449	e317	e557	e861	13000	3380	1890	1040	747	258
15	143	271	e433	e357	e575	e877	13100	3230	1880	1060	743	520
16	141	274	e415	e403	e581	e906	12400	3120	1820	1010	738	696
17	144	222	e400	e449	e614	e859	11800	3020	1770	938	704	696
18	167	165	e367	e463	e630	e842	11600	2950	1690	898	682	628
19	231	179	e368	e455	e660	e847	11700	2900	1530	879	678	602
20	258	207	e321	e428	e727	e848	12000	2850	1470	871	688	598
21	252	224	e275	e443	e764	e845	12300	2810	1420	857	703	554
22	245	e274	e320	e460	e777	e842	12000	2790	1430	843	704	526
23	231	e332	e382	e514	e806	e835	11400	2830	1440	834	701	521
24	220	e343	e371	e583	e861	e834	10900	2890	1420	830	702	523
25	223	e337	e368	e549	e910	e835	10300	2890	1380	828	720	569
26	317	e324	e363	e527	e928	e834	9720	2850	1310	832	727	550
27	311	e314	e340	e513	e937	e831	9190	2780	1270	841	715	520
28	256	e323	e328	e498	e949	e831	8630	2720	1180	834	679	508
29	225	e330	e335	e484	---	e870	8030	2660	1120	821	664	502
30	224	e333	e362	e504	---	e916	7580	2620	1200	812	686	505
31	244	---	e358	e534	---	e987	---	2580	---	807	690	---
TOTAL	7286	8348	11600	13111	18514	27657	295920	121690	54280	31885	22610	18013
MEAN	235	278	374	423	661	892	9864	3925	1809	1029	729	600
MAX	347	459	553	583	949	1010	13100	7240	2530	1390	797	740
MIN	141	157	275	314	537	831	1280	2580	1120	807	664	258
AC-FT	14450	16560	23010	26010	36720	54860	587000	241400	107700	63240	44850	35730

e Estimated

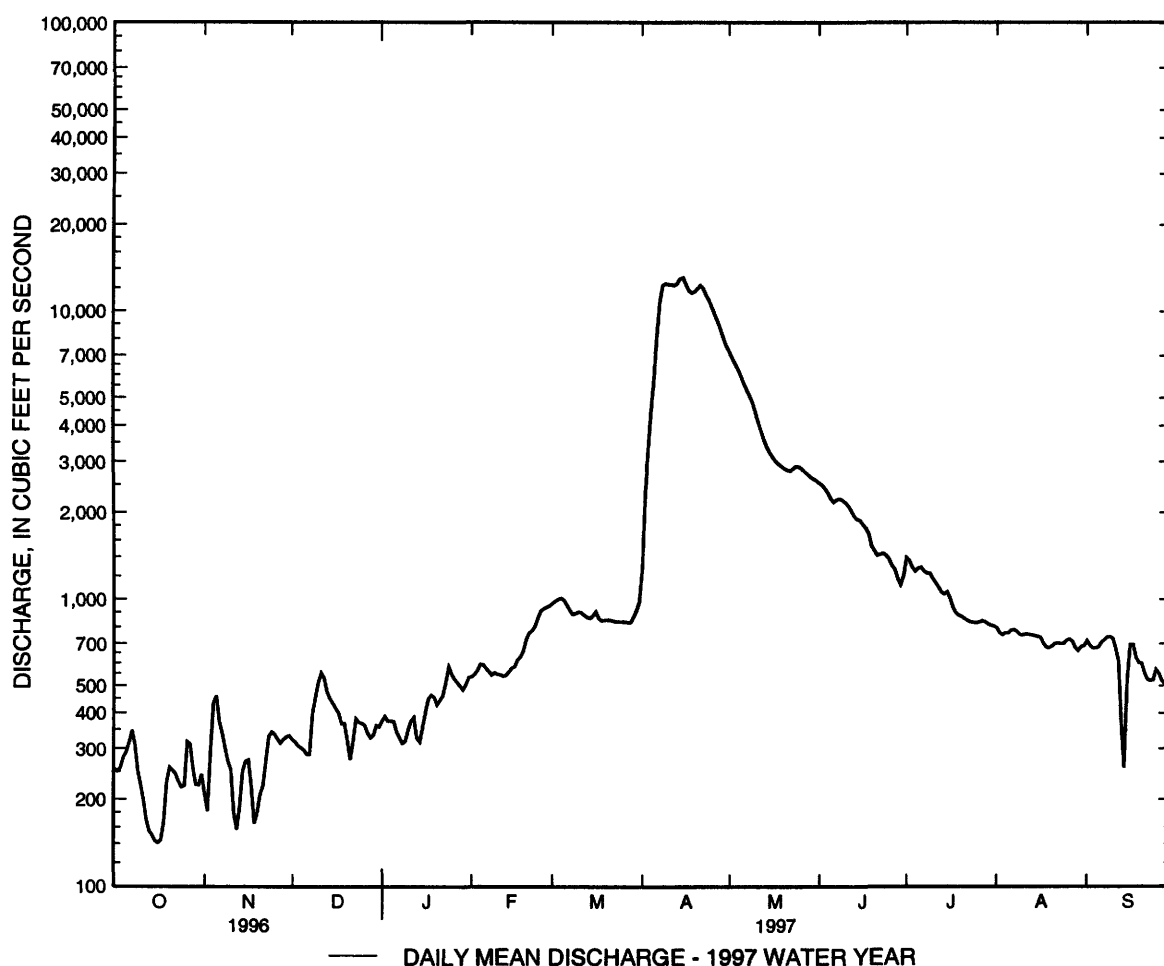
RED RIVER OF THE NORTH BASIN

05051522 RED RIVER OF THE NORTH AT HICKSON, ND--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	397	332	291	284	336	922	2205	1285	1039	840	511	434
MAX	1558	900	817	747	745	2687	9864	3925	2485	2674	2674	2135
(WY)	1994	1987	1986	1986	1987	1995	1997	1997	1986	1993	1993	1993
MIN	2.02	.000	.000	4.95	14.0	75.9	165	22.0	86.4	73.4	35.6	12.6
(WY)	1977	1977	1977	1977	1977	1977	1977	1977	1977	1977	1977	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1975 - 1997
ANNUAL TOTAL	377687	630914	
ANNUAL MEAN	1032	1729	740
HIGHEST ANNUAL MEAN			1729
LOWEST ANNUAL MEAN			53.1
HIGHEST DAILY MEAN	6190	Apr 14	13100
LOWEST DAILY MEAN	141	Sep 20	141
ANNUAL SEVEN-DAY MINIMUM	153	Oct 12	153
INSTANTANEOUS PEAK FLOW			13300
INSTANTANEOUS PEAK STAGE			37.60
ANNUAL RUNOFF (AC-FT)	749100	1251000	536000
10 PERCENT EXCEEDS	2760	4440	1780
50 PERCENT EXCEEDS	457	722	394
90 PERCENT EXCEEDS	220	258	85



RED RIVER OF THE NORTH BASIN

05051522 RED RIVER OF THE NORTH AT HICKSON, ND--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water year 1976 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND-ARD UNITS) (00403)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	OXYGEN DEMAND, BIO-CHIMI-CAL, 5 D * Y (MG/L) (00302)	
OCT 02...	1530	243	--	493	--	--	--	7.5	11.0	--	--	--	
NOV 08...	1110	293	--	706	--	--	--	0.5	3.0	--	--	--	
DEC 31...	1140	372	--	580	--	--	--	-8.0	0.5	--	--	--	
FEB 25...	1445	920	--	764	--	--	--	0.5	0.5	--	--	--	
APR 09...	1540	12400	--	260	8.0	--	--	-5.0	1.0	--	--	--	
14...	1630	13300	--	355	--	--	--	10.0	0.5	--	--	--	
18...	1245	11900	--	336	--	7.3	--	--	--	--	--	--	
25...	1215	10200	--	411	--	--	--	16.5	12.0	--	--	--	
29...	0925	7900	--	436	--	--	--	13.0	12.5	--	--	--	
MAY 09...	1050	4870	--	584	--	--	--	9.0	12.0	--	--	--	
14...	1300	3380	--	595	--	--	--	6.5	11.0	--	--	--	
19...	1500	--	2900	568	7.9	--	742	--	13.5	8.5	84	2.0	
JUN 09...	1415	--	2180	593	7.3	--	--	--	22.0	7.2	--	2.0	
JUL 21...	1515	--	783	540	7.4	--	--	--	26.0	6.9	--	--	
AUG 11...	1500	--	756	430	8.0	--	--	--	23.0	7.4	--	1.0	
SEP 15...	1615	--	483	497	7.3	--	--	--	21.0	8.7	--	2.0	
DATE		HARD-NESS TOTAL (MG/L AS CACO3) (00900)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCHI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM TOTAL RECOVER-ABLE (MG/L) (00918)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, TOTAL RECOVER-ABLE (MG/L) (00921)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, TOTAL RECOVER-ABLE (MG/L) (00923)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SOL-IUM AD-DI-TION RATIO (00931)
APR 18...	150	97	--	--	--	--	34	--	15	--	7.5	10	0.3
MAY 19...	--	175	740	K500	55	--	30	--	13	--	--	--	--
JUN 09...	--	185	K16	44	67	--	37	--	14	--	--	--	--
JUL 21...	--	--	K42	K40	--	--	--	--	--	--	--	--	--
AUG 11...	--	198	K100	110	44	--	29	--	7.3	--	--	--	--
SEP 15...	--	203	100	160	44	--	30	--	11	--	--	--	--
DATE		POTAS-SIUM, TOTAL RECOVER-ABLE (MG/L) (00939)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)
APR 18...	--	4.0	70	7.3	0.20	196	203	0.28	6530	--	--	--	--
MAY 19...	5.9	--	110	9.8	--	--	--	--	--	0.070	0.055	0.70	--
JUN 09...	6.2	--	150	<1.0	--	--	--	--	--	0.070	<0.010	0.74	--
JUL 21...	--	--	--	--	--	--	--	--	--	--	--	--	--
AUG 11...	4.0	--	21	9.2	--	--	--	--	--	0.040	<0.010	0.76	--
SEP 15...	4.6	--	30	14	--	--	--	--	--	0.110	<0.010	0.49	--

RED RIVER OF THE NORTH BASIN

05051522 RED RIVER OF THE NORTH AT HICKSON, ND--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORGANIC TOTAL (MG/L AS P) (00670)	ALUMI- NUM, TOTAL RECOVER -ABLE (UG/L) (01104)	ANTI- MONY, TOTAL (UG/L AS SB) (01097)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, TOTAL RECOVER -ABLE (UG/L) (01009)	BERYL- LIUM TOTAL RECOVER -ABLE (UG/L) (00998)	BORON, TOTAL RECOVER -ABLE (UG/L) (00999)
APR 18...	--	--	--	--	--	--	--	--	3	--	--	--
MAY 19...	0.75	0.83	0.161	0.076	0.16	1300	1	4	--	91	<0.2	100
JUN 09...	0.74	0.81	0.205	0.101	0.20	2200	<2	4	--	110	<0.2	100
AUG 11...	0.76	0.80	0.149	0.046	0.15	1900	<1	5	--	<1	<1	100
SEP 15...	0.49	0.60	0.018	0.097	0.02	1300	<1	4	--	110	<1	100

DATE	CADMIUM TOTAL RECOVER -ABLE (UG/L) (01113)	CHRO- MIUM, TOTAL RECOVER -ABLE (UG/L) (01118)	COPPER, TOTAL RECOVER -ABLE (UG/L) (01119)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOVER -ABLE (UG/L) (01114)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGAN- ESE TOTAL RECOVER -ABLE (UG/L) (01123)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)
APR 18...	--	--	--	--	40	--	<1.0	10	--	20	<0.1
MAY 19...	0.03	2	8	2100	--	2	--	--	120	--	--
JUN 09...	0.03	4	6	3500	--	5	--	--	230	--	--
AUG 11...	<1	4	23	3100	--	7	--	--	160	--	--
SEP 15...	<1	3	6	2400	--	3	--	--	130	--	--

DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, TOTAL RECOVER -ABLE (UG/L) (01074)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, TOTAL RECOVER -ABLE (UG/L) (01079)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	THAL- LIUM TOTAL RECOEVER -ABLE (UG/L AS TL) (01128)	ZINC, TOTAL RECOVER -ABLE (UG/L) (01094)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR 18...	<1.0	--	--	<1	--	180	--	--	--	--	--
MAY 19...	--	7	1	--	1	--	<0.03	8	103	806	99
JUN 09...	--	8	0.2	--	1	--	0.09	20	156	918	98
JUL 21...	--	--	--	--	--	--	--	--	160	338	100
AUG 11...	--	7	<1	--	<1	--	<1	30	126	257	100
SEP 15...	--	6	<1	--	<1	--	<1	30	112	146	99

RED RIVER OF THE NORTH BASIN

05054000 RED RIVER OF THE NORTH AT FARGO, ND

LOCATION.--Lat 46°51'40", long 96°47'00", in NW¼NE¼ sec. 18, T.139 N., R.48 W., Cass County, Hydrologic Unit 09020104, at water treatment plant on 4th St. S. in Fargo, 25 mi upstream from mouth of Sheyenne River, and at mile 453.

DRAINAGE AREA.--6,800 mi², approximately.

PERIOD OF RECORD.--May 1901 to current year. Published as "at Moorhead, Minn.", 1901. Monthly discharge only for some periods, in V'SP 1308.

REVISED RECORDS.--WSP 1308: 1902-4, 1906-7, 1910-14, 1916, 1918, 1924. WSP 1388: 1905-6, 1917-20(M), 1935(M), 1938-39(M), 1943.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 861.8 ft above sea level. Oct. 1, 1960 to Sept. 30, 1962, water-stage recorder at present site at datum 5.6 ft higher. See WSP 1728 or 1913 for history of changes prior to Oct. 1, 1960.

REMARKS.--Records poor. Flow regulated by Orwell Reservoir, capacity, 14,100 acre-ft at 1,070 ft above sea level, adjustment of 1912; Lake Traverse, capacity 137,000 acre-ft, available for flood control, other controlled lakes and ponds, and several power plants. Some small diversions for municipal supply. Figures of daily discharge do not include diversions to cities of Fargo, ND and Moorhead, MN, and from Sheyenne River.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 7, 1897, reached a stage of 39.1 ft present datum, discharge, 25,000 ft³/s at site 1.5 mi downstream.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	278	278	254	327	e590	e940	e2400	13200	2940	1920	943	845
2	278	239	251	328	e580	e940	3030	12100	3030	1980	949	762
3	284	249	249	334	e580	e940	4100	11100	3000	1920	911	733
4	282	465	239	362	e580	e940	e4800	10300	2960	1890	866	721
5	302	644	227	348	e580	e950	6740	9620	2890	1880	988	715
6	325	591	220	338	e580	e950	9290	8970	2810	1920	970	729
7	382	446	193	323	e580	e950	11600	8340	2800	1960	911	762
8	402	365	209	312	e580	e940	14600	7770	e2750	1860	898	830
9	350	294	324	326	e580	e940	18000	7190	e2700	1790	898	771
10	268	261	413	e350	e580	e930	19700	6600	e2650	1710	883	776
11	239	223	448	e400	e590	e930	19900	6020	e2600	1620	904	731
12	210	160	476	e450	e590	e920	20300	5460	e2580	1680	903	702
13	180	147	434	e430	e590	e920	20500	4900	2550	1530	886	534
14	160	177	389	e420	e590	e930	22000	4370	2480	1450	869	337
15	152	219	372	e450	e590	e930	24600	3910	2500	1430	867	353
16	143	241	368	e480	e600	e940	26300	3520	2430	1410	858	646
17	169	234	370	e510	e630	e940	27800	3210	2360	1300	830	688
18	171	173	316	e550	e660	e940	27000	2960	2300	1220	785	674
19	191	135	386	e520	e690	e950	25800	2750	2250	1190	766	605
20	256	137	372	e500	e720	e950	25600	2600	2120	1170	763	619
21	286	146	332	e490	e760	e950	25400	2550	2020	1130	770	592
22	276	163	336	e500	e800	e960	24700	2610	2020	1110	778	546
23	269	211	368	e480	e850	e970	23800	3190	2670	1090	780	553
24	254	257	441	e550	e900	e980	22900	3100	2270	1080	780	540
25	246	263	474	e620	e920	e980	21300	2900	2020	1060	786	566
26	359	261	477	e610	e920	e980	19800	2830	1880	1060	794	619
27	420	248	415	e610	e920	e1000	18400	2820	1770	1060	786	585
28	359	244	371	e600	e930	e1000	17000	2830	1680	1040	776	572
29	440	238	361	e600	---	e1000	15700	2840	1560	1010	735	553
30	324	249	314	e600	---	e1000	14400	2870	1660	981	727	553
31	274	---	321	e600	---	e1100	---	2900	---	955	746	---
TOTAL	8529	7958	10720	14318	19060	29690	537460	166330	72250	44406	26106	19212
MEAN	275	265	346	462	681	958	17920	5365	2408	1432	842	640
MAX	440	644	477	620	930	1100	27800	13200	3030	1980	988	845
MIN	143	135	193	312	580	920	2400	2550	1560	955	727	337
AC-FT	16920	15780	21260	28400	37810	58890	1066000	329900	143300	88080	51780	38110
(+)	1440	1330	1430	1480	1360	1530	1150	1160	1340	1290	1420	1220
*	18360	17110	22690	29880	39170	60420	1067000	331100	144600	89370	53200	39330

e Estimated

+ Diversions in acre-feet to cities of Fargo and Moorhead.

* Adjusted for diversions to cities of Fargo and Moorhead.

RED RIVER OF THE NORTH BASIN

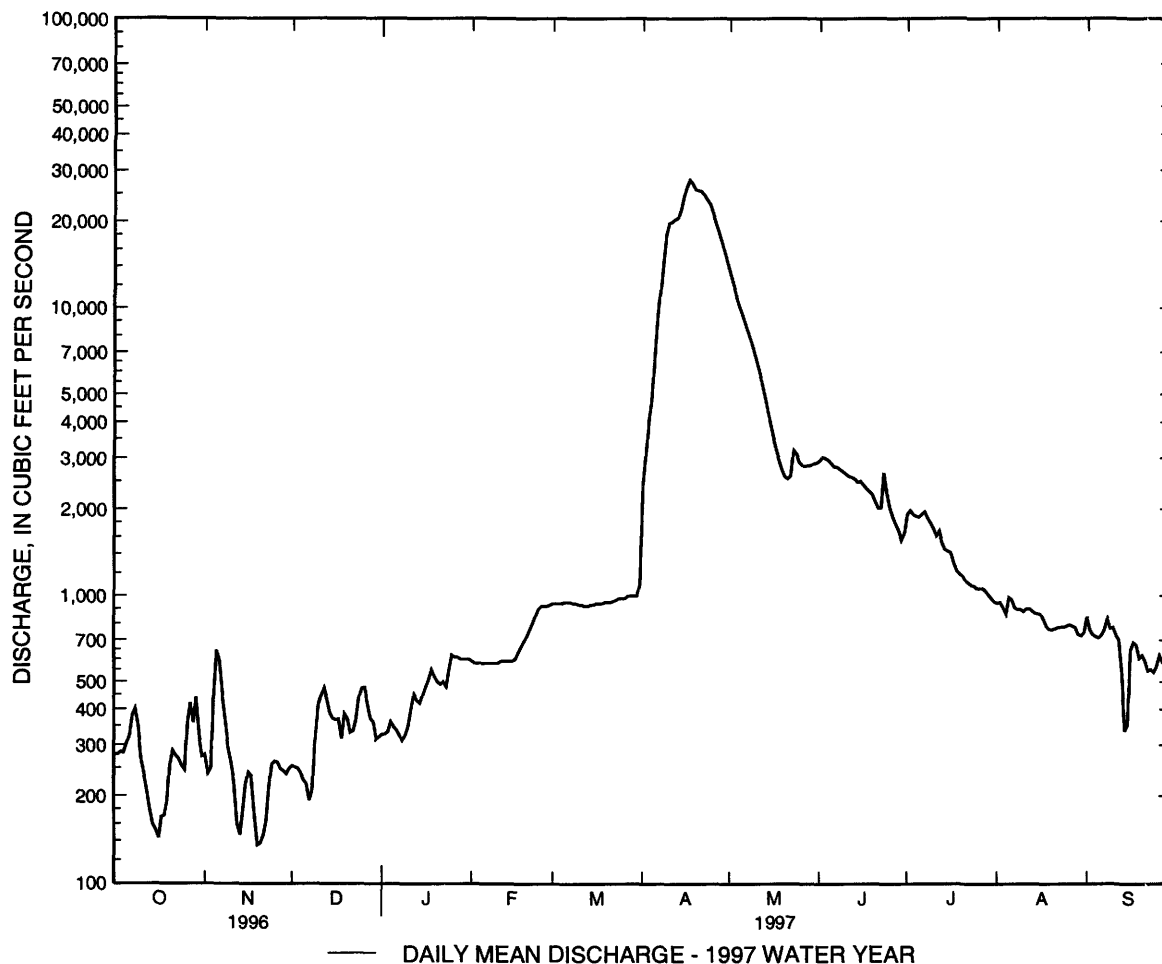
05054000 RED RIVER OF THE NORTH AT FARGO, ND--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1901 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	314	273	226	210	213	724	1929	1092	1038	861	416	318
MAX	1741	942	800	740	778	4722	17920	5365	5122	5692	3293	2280
(WY)	1994	1907	1987	1986	1987	1995	1997	1997	1962	1962	1993	1993
MIN	.000	.000	.000	.000	.18	26.8	102	8.12	2.87	.000	.000	.000
(WY)	1935	1937	1938	1933	1933	1937	1934	1934	1936	1934	1932	1934

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1901 - 1997
ANNUAL TOTAL	494896	956039	
ANNUAL MEAN	1352 (*1378)	2619 (*2655)	636
HIGHEST ANNUAL MEAN			2619
LOWEST ANNUAL MEAN			17.5
HIGHEST DAILY MEAN	9880	27800	27800
LOWEST DAILY MEAN	127	135	.00
ANNUAL SEVEN-DAY MINIMUM	150	167	.00
INSTANTANEOUS PEAK FLOW		28000	28000
INSTANTANEOUS PEAK STAGE		39.72	39.72
ANNUAL RUNOFF (AC-FT)	981600(*999900)	1896000(*1912000)	460500
10 PERCENT EXCEEDS	3820	6250	1380
50 PERCENT EXCEEDS	485	785	309
90 PERCENT EXCEEDS	220	253	39

* Adjusted for diversions to cities of Fargo and Moorhead.



RED RIVER OF THE NORTH BASIN

05054000 RED RIVER OF THE NORTH AT FARGO, ND--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water year 1956 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND-ARD UNITS) (00403)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	CALC'UM DIS-SOLVED (MG/L AS CA) (00915)
OCT 04...	1050	281	532	--	--	--	12.0	11.5	--	--	--
NOV 07...	1210	457	627	--	--	--	3.5	3.0	--	--	--
DEC 19...	1630	387	--	--	--	--	-10.0	0.5	--	--	--
FEB 04...	1700	575	716	--	--	--	--	0.5	--	--	--
MAR 25...	1110	980	962	--	--	--	0.0	0.5	--	--	--
APR 03...	1000	3820	517	--	--	--	7.0	1.0	--	--	--
19...	1300	25200	333	332	7.7	7.4	7.5	15.5	150	93	34
28...	1305	17000	--	--	--	--	18.0	13.0	--	--	--
MAY 02...	1440	12100	--	--	--	--	19.0	13.5	--	--	--
14...	0945	4460	736	--	--	--	7.0	11.0	--	--	--

DATE	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70313)
APR 19...	15	11	14	0.4	4.8	73	6.9	0.10	201	222	0.30

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01070)
APR 19...	15100	3	50	<1.0	20	10	0.1	<1.0	<1	170

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RED RIVER OF THE NORTH BASIN
05061000 BUFFALO RIVER NEAR HAWLEY, MN

LOCATION.--Lat 46°51'00", long 96°19'45", in NW¼SE¼ sec. 14, T.139 N., R.45 W., Clay County, Hydrologic Unit 09020106, near left downstream end of bridge on farm lane, 2 mi southwest of Hawley.

DRAINAGE AREA.--322 mi².

PERIOD OF RECORD.--March 1945 to current year, WY 1981 (annual maximum only), March 1982 to September 1985 (no winter records).

REVISED RECORDS.--WSP 1308: 1945-46(M), 1948(M).

GAGE.--Water-stage recorder. Datum of gage is 1,111.91 ft above sea level. Prior to Jan. 29, 1953, nonrecording gage at bridge 1,800 ft upstream at datum 3.17 ft lower.

REMARKS.--Records good except those for estimated daily discharges, which are poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known, about 11.3 ft, present datum, spring of 1921, from information by local resident.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30	e96	e43	e33	e35	e30	e100	355	233	197	92	131
2	37	e94	e43	e34	e34	e30	e380	326	218	193	89	138
3	29	e92	e43	e34	e34	e30	e450	309	209	206	108	114
4	26	e82	e43	e33	e34	e29	e1400	300	204	245	109	98
5	24	e80	e42	e33	e34	e29	e1900	286	191	286	105	86
6	25	e81	e42	e32	e34	e29	e2360	265	177	296	112	78
7	23	e83	e42	e32	e33	e29	e1600	249	167	284	109	73
8	22	e86	e42	e32	e33	e29	e1520	250	156	316	98	77
9	22	e79	e42	e31	e33	e29	e1430	250	149	329	93	76
10	21	e72	e42	e31	e33	e29	e1350	240	143	311	91	76
11	21	e68	e42	e32	e32	e29	e1230	235	136	281	88	69
12	21	e64	e42	e32	e32	e28	e1180	236	129	264	84	79
13	21	e59	e41	e32	e32	e28	e1350	230	137	301	81	103
14	20	e54	e40	e32	e32	e28	1600	222	141	434	78	97
15	20	e51	e40	e32	e31	e28	1540	216	144	417	80	83
16	20	e52	e39	e32	e31	e28	1370	209	139	368	79	77
17	27	e55	e39	e33	e31	e28	1190	203	136	310	80	71
18	34	e53	e38	e33	e31	e28	1160	196	131	258	78	65
19	39	e46	e38	e34	e31	e28	1070	190	129	233	76	61
20	35	e45	e37	e36	e31	e28	979	187	132	215	74	57
21	36	e44	e37	e37	e30	e28	899	182	126	202	72	55
22	36	e44	e37	e37	e30	e28	808	188	113	188	68	52
23	34	e44	e36	e37	e30	e27	723	279	204	174	71	49
24	32	e43	e36	e36	e30	e24	650	375	213	160	70	47
25	32	e43	e35	e36	e30	e22	580	435	416	149	64	49
26	35	e43	e35	e36	e30	e18	525	433	353	139	63	46
27	38	e43	e34	e36	e30	e15	483	400	261	131	61	43
28	40	e43	e34	e35	e30	e14	452	348	180	125	60	45
29	59	e43	e34	e35	---	e16	417	306	193	116	58	45
30	100	e43	e33	e35	---	e20	385	278	208	107	57	44
31	e105	---	e33	e35	---	e29	---	256	---	98	57	---
TOTAL	1064	1825	1204	1048	891	815	31081	8434	5468	7333	2505	2184
MEAN	34.3	60.8	38.8	33.8	31.8	26.3	1036	272	182	237	80.8	72.8
MAX	105	96	43	37	35	30	2360	435	416	434	112	138
MIN	20	43	33	31	30	14	100	182	113	98	57	43
AC-FT	2110	3620	2390	2080	1770	1620	61650	16730	10850	14550	4970	4330
CFSM	.11	.19	.12	.10	.10	.08	3.22	.84	.57	.73	.25	.23
IN.	.12	.21	.14	.12	.10	.09	3.59	.97	.63	.85	.25	.25

e Estimated

RED RIVER OF THE NORTH BASIN

05061000 BUFFALO RIVER NEAR HAWLEY, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1997, BY WATER YEAR (WY)

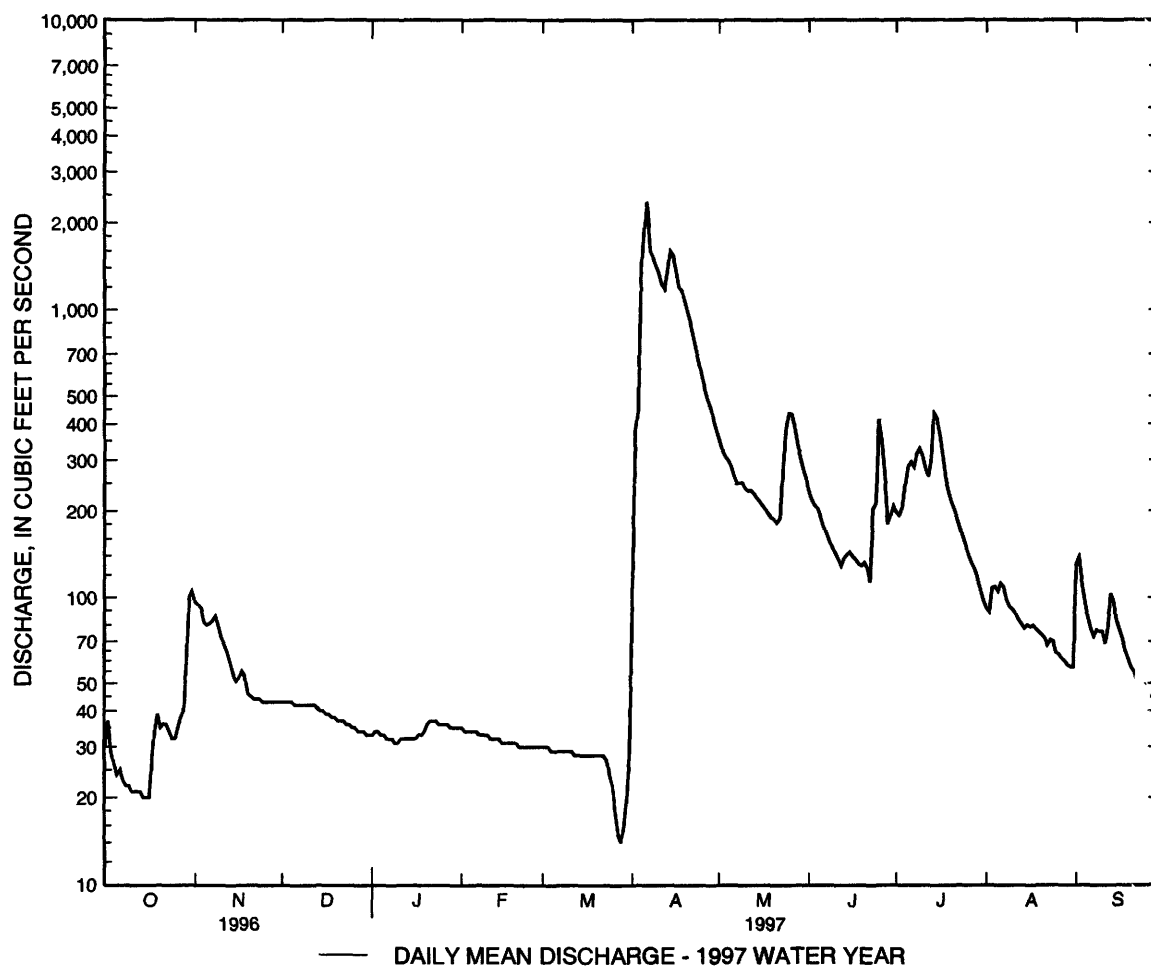
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	39.1	36.9	25.2	21.1	21.9	85.9	268	130	99.3	101	52.1	38.3
MAX	151	176	63.8	54.7	99.6	434	1036	372	530	784	472	182
(WY)	1974	1972	1972	1981	1981	1966	1997	1985	1962	1993	1955	1957
MIN	11.6	12.2	10.6	9.94	9.88	15.0	33.3	21.5	12.7	10.1	5.87	8.52
(WY)	1979	1977	1977	1962	1949	1969	1981	1977	1977	1976	1976	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1945 - 1997
ANNUAL TOTAL	38405	63852	
ANNUAL MEAN	105	175	76.7
HIGHEST ANNUAL MEAN			175
LOWEST ANNUAL MEAN			16.7
HIGHEST DAILY MEAN	1190	2360 ^a	2360 ^a
LOWEST DAILY MEAN	18	14	3.2
ANNUAL SEVEN-DAY MINIMUM	19	18	4.3
INSTANTANEOUS PEAK FLOW		2360 ^b	2360
INSTANTANEOUS PEAK STAGE		10.77 ^c	10.77 ^c
INSTANTANEOUS LOW FLOW			2.8
ANNUAL RUNOFF (AC-FT)	76180	126700	55580
ANNUAL RUNOFF (INCHES)	4.44	7.38	3.24
10 PERCENT EXCEEDS	254	371	181
50 PERCENT EXCEEDS	38	60	32
90 PERCENT EXCEEDS	25	29	14

a Estimated, backwater from ice.

b Daily discharge, estimated, backwater from ice.

c Backwater from ice.



RED RIVER OF THE NORTH BASIN

05061500 SOUTH BRANCH BUFFALO RIVER AT SABIN, MN

LOCATION--Lat 46° 46' 20", long 96° 37' 40", in SW 1/4 SW 1/4 sec. 9, T.138 N., R.47 W., Clay County, Hydrologic Unit 09020106, near center of span on downstream side of highway bridge, 0.3 mi downstream from Stony Creek and 1 mi east of Sabin.

DRAINAGE AREA.--522 mi².

PERIOD OF RECORD.--March 1945 to current year. Water year 1981, annual maximum only. March 1982 to September 1985, no winter records.

REVISED RECORDS.--WSP 1308: 1949(M).

GAGE.--Water-stage recorder. Datum of gage is 902.39 ft above mean sea level (levels by Soil Conservation Service). Prior to April 17, 1948, nonrecording gage at site 1 mi downstream at different datum. Aug. 17, 1948 to Oct. 4, 1989, nonrecording gage at present site and datum.

REMARKS.--Records fair except those for estimated daily discharges, which are poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.7	22	e4.0	e1.1	e1.1	e.93	e20	201	54	125	22	3.6
2	6.2	24	e3.8	e1.1	e1.1	e.93	e120	170	47	154	20	9.5
3	8.6	25	e3.6	e1.1	e1.1	e.93	e700	144	43	233	20	27
4	8.9	25	e3.4	e1.1	e1.1	e.93	e3000	120	40	332	17	30
5	9.2	26	e3.2	e1.1	e1.1	e.93	e5850	99	39	366	19	27
6	10	27	e3.0	e1.1	e1.0	e.93	e4600	98	39	353	22	27
7	8.7	25	e2.9	e1.1	e1.0	e.94	e3200	100	37	325	22	28
8	4.2	22	e2.7	e1.1	e1.0	e.94	e2600	97	35	293	24	29
9	3.2	21	e2.6	e1.1	e1.0	e.94	e2650	93	32	268	22	25
10	2.5	e20	e2.4	e1.1	e1.0	e.94	e2500	95	29	266	22	23
11	2.5	e18	e2.3	e1.1	e1.0	e.94	e2300	92	25	247	21	21
12	2.5	e17	e2.2	e1.1	e.99	e.95	2110	85	23	226	19	20
13	2.2	e15	e2.1	e1.2	e.99	e.95	2230	79	23	201	16	21
14	2.1	e14	e2.0	e1.2	e.98	e.96	3290	70	20	170	15	23
15	2.6	e13	e1.9	e1.2	e.98	e.97	3670	63	20	145	14	26
16	2.9	e12	e1.9	e1.2	e.98	e.98	2740	64	18	129	12	27
17	3.8	e11	e1.8	e1.2	e.97	e.99	1740	61	16	123	10	26
18	6.1	e10	e1.7	e1.2	e.97	e1.0	1300	57	15	124	11	23
19	6.9	e9.0	e1.7	e1.2	e.97	e1.0	1010	51	15	124	11	20
20	8.4	e8.2	e1.6	e1.2	e.96	e1.0	808	47	22	116	9.4	18
21	12	e7.7	e1.6	e1.2	e.96	e1.0	704	44	20	101	8.6	16
22	14	e7.2	e1.5	e1.2	e.95	e1.1	618	51	25	86	7.0	15
23	15	e6.7	e1.5	e1.2	e.95	e1.1	523	63	125	74	7.3	13
24	17	e6.2	e1.4	e1.2	e.94	e1.1	444	75	152	63	5.3	11
25	18	e5.8	e1.4	e1.2	e.94	e1.2	381	150	257	54	3.6	5.9
26	19	e5.4	e1.3	e1.1	e.94	e1.2	338	220	302	46	3.1	3.6
27	20	e5.0	e1.3	e1.1	e.94	e1.3	298	203	262	40	2.5	2.8
28	20	e4.7	e1.3	e1.1	e.94	e1.4	266	159	216	36	2.7	2.7
29	21	e4.4	e1.2	e1.1	---	e1.6	248	119	178	31	2.7	2.8
30	22	e4.2	e1.2	e1.1	---	e1.9	227	88	144	27	2.3	3.0
31	21	---	e1.2	e1.1	---	e2.4	---	68	---	25	2.1	---
TOTAL	304.2	421.5	65.7	35.4	27.85	34.38	50485	3126	2273	4903	395.6	529.9
MEAN	9.81	14.1	2.12	1.14	.99	1.11	1683	101	75.8	158	12.8	17.7
MAX	22	27	4.0	1.2	1.1	2.4	5850	220	302	366	24	30
MIN	2.1	4.2	1.2	1.1	.94	.93	20	44	15	25	2.1	2.7
AC-FT	603	836	130	70	55	68	100100	6200	4510	9730	785	1050
CFSM	.02	.03	.00	.00	.00	.00	3.22	.19	.15	.30	.02	.03
IN.	.02	.03	.00	.00	.00	.00	3.60	.22	.16	.35	.03	.04

e Estimated

RED RIVER OF THE NORTH BASIN

05061500 SOUTH BRANCH BUFFALO RIVER AT SABIN, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	15.0	14.9	5.03	1.72	1.64	105	281	82.4	90.3	76.6	11.8	13.6
MAX	59.2	76.7	23.5	13.1	14.0	581	1683	580	1068	1112	152	174
(WY)	1996	1972	1978	1978	1987	1966	1997	1962	1962	1975	1993	1986
MIN	.023	2.05	.006	.000	.000	.000	27.9	8.28	1.30	.000	.000	.000
(WY)	1977	1977	1961	1946	1946	1951	1973	1980	1976	1988	1976	1976

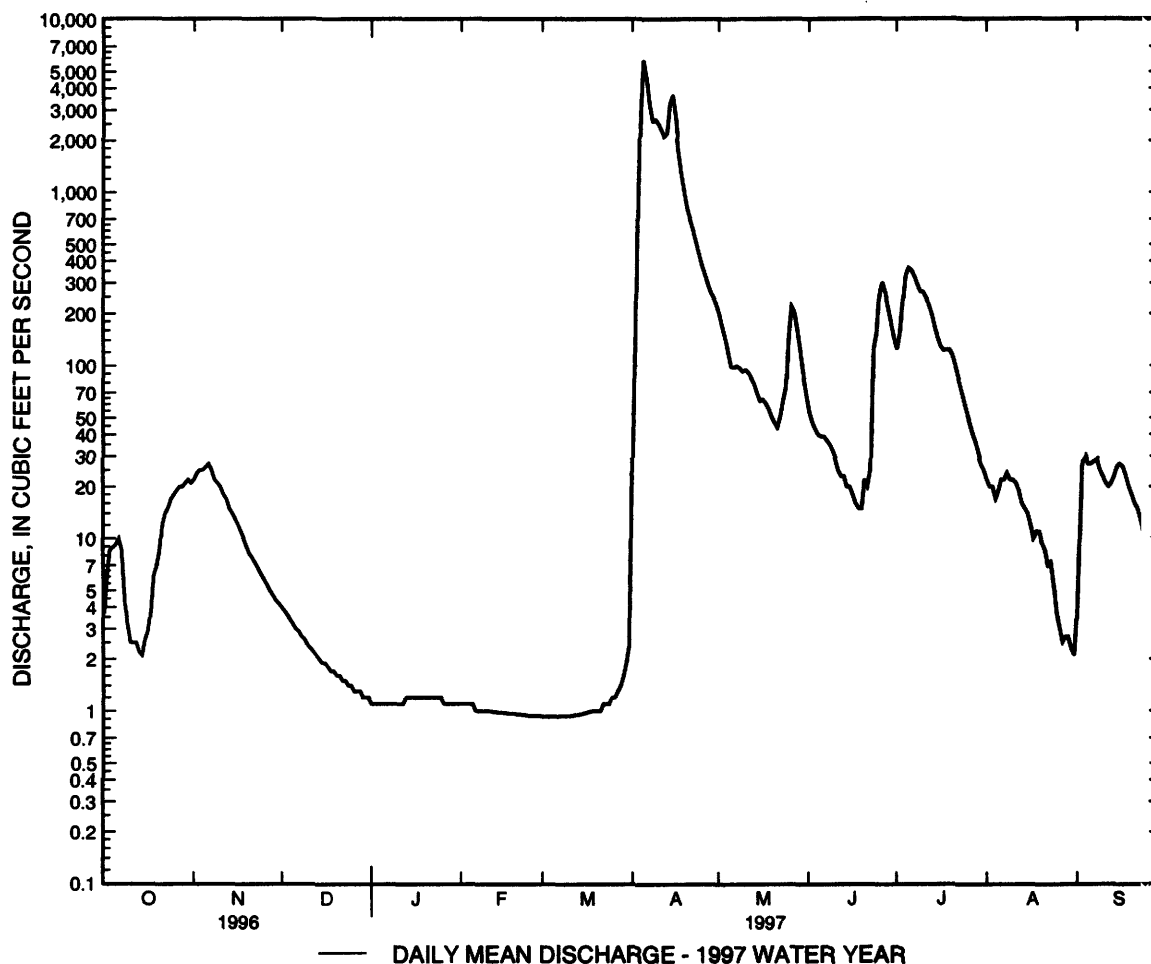
SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1945 - 1997
ANNUAL TOTAL	25667.19	62601.53	
ANNUAL MEAN	70.1	172	58.7 ^a
HIGHEST ANNUAL MEAN			198
LOWEST ANNUAL MEAN			12.2
HIGHEST DAILY MEAN	1890	May 20	8200
LOWEST DAILY MEAN	.56	Sep 21	.00 ^c
ANNUAL SEVEN-DAY MINIMUM	.59	Jan 29	.00
INSTANTANEOUS PEAK FLOW			8500
INSTANTANEOUS PEAK STAGE		19.11 ^d	19.90
INSTANTANEOUS LOW FLOW			.00
ANNUAL RUNOFF (AC-FT)	50910	124200	42530
ANNUAL RUNOFF (INCHES)	1.83	4.46	1.53
10 PERCENT EXCEEDS	150	252	104
50 PERCENT EXCEEDS	4.4	13	7.2
90 PERCENT EXCEEDS	.59	1.0	.00

a Median of annual mean discharges is 42.1 ft³/s.

b Estimated, backwater from ice.

c Many days, most years.

d Backwater from ice.



RED RIVER OF THE NORTH BASIN

05062000 BUFFALO RIVER NEAR DILWORTH, MN

LOCATION--Lat 46° 57' 40", long 96° 39' 40", in SW 1/4 SE 1/4 sec. 6, T.140 N., R.47 W., Clay County, Hydrologic Unit 09020106, on left bank 4.5 mi southeast of Kragnes, 6.5 mi northeast of Dilworth, and 9 mi downstream from South Branch.

DRAINAGE AREA.--1,040 mi², approximately.

PERIOD OF RECORD.--March 1931 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1931(M).

GAGE.--Water-stage recorder. Datum of gage is 878.31 ft above sea level (levels by U.S. Army Corps of Engineers). Prior to April 5, 1937, nonrecording gage at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	42	e160	e71	e37	e37	e33	e160	723	396	500	150	62
2	40	e180	e71	e36	e36	e33	e300	647	364	457	136	96
3	39	167	e70	e36	e36	e32	e700	576	339	424	132	154
4	43	192	e69	e36	e36	e32	e1600	516	316	451	136	152
5	41	175	e69	e36	e36	e32	e3600	474	295	535	145	155
6	37	156	e68	e35	e36	e32	e8370	445	273	631	146	141
7	36	153	e68	e35	e35	e32	e7300	416	256	698	151	125
8	36	152	e67	e35	e35	e32	e6500	401	238	735	150	123
9	34	151	e67	e35	e35	e32	e5700	391	222	740	141	126
10	33	e142	e66	e35	e35	e32	e5200	384	208	723	131	120
11	35	e130	e65	e35	e35	e32	e4800	374	196	695	125	115
12	37	e120	e64	e35	e34	e32	e4600	368	187	664	120	111
13	40	e105	e63	e35	e34	e32	e4300	363	177	618	114	112
14	38	e94	e62	e35	e33	e32	e5200	363	167	575	105	135
15	35	e85	e60	e35	e33	e32	e6950	e355	180	567	100	148
16	34	e86	e58	e35	e33	e32	e6400	e340	186	568	97	139
17	35	e86	e56	e35	e33	e32	5410	e330	183	542	95	132
18	38	e84	e54	e36	e33	e32	4290	e320	177	497	93	124
19	47	e77	e52	e37	e33	e32	3500	e310	174	444	88	114
20	56	e77	e51	e38	e33	e32	2900	e305	169	404	86	103
21	64	e76	e49	e39	e33	e33	2460	e300	177	379	84	94
22	64	e76	e48	e40	e33	e33	2110	e320	174	353	80	87
23	64	e75	e47	e39	e33	e34	1840	441	300	324	76	82
24	68	e74	e45	e39	e33	e34	1620	565	612	296	73	76
25	69	e74	e44	e39	e33	e35	1440	591	684	269	71	70
26	71	e73	e42	e39	e33	e35	1270	578	680	246	70	68
27	82	e73	e41	e38	e33	e36	1130	611	720	226	65	68
28	83	e72	e40	e38	e33	e37	1010	625	711	208	61	64
29	87	e72	e39	e38	---	e38	900	589	630	192	59	63
30	111	e72	e38	e37	---	e40	809	520	544	181	59	62
31	e145	---	e37	e37	---	e43	---	452	---	166	57	---
TOTAL	1684	3309	1741	1135	955	1040	102369	13993	9935	14308	3196	3221
MEAN	54.3	110	56.2	36.6	34.1	33.5	3412	451	331	462	103	107
MAX	145	192	71	40	37	43	8370	723	720	740	151	155
MIN	33	72	37	35	33	32	160	300	167	166	57	62
AC-FT	3340	6560	3450	2250	1890	2060	203000	27760	19710	28380	6340	6390
CFSM	.05	.11	.05	.04	.03	.03	3.28	.43	.32	.44	.10	.10
IN.	.06	.12	.06	.04	.03	.04	3.66	.50	.36	.51	.11	.12

e Estimated

RED RIVER OF THE NORTH BASIN
05062000 BUFFALO RIVER NEAR DILWORTH, MN--Continued

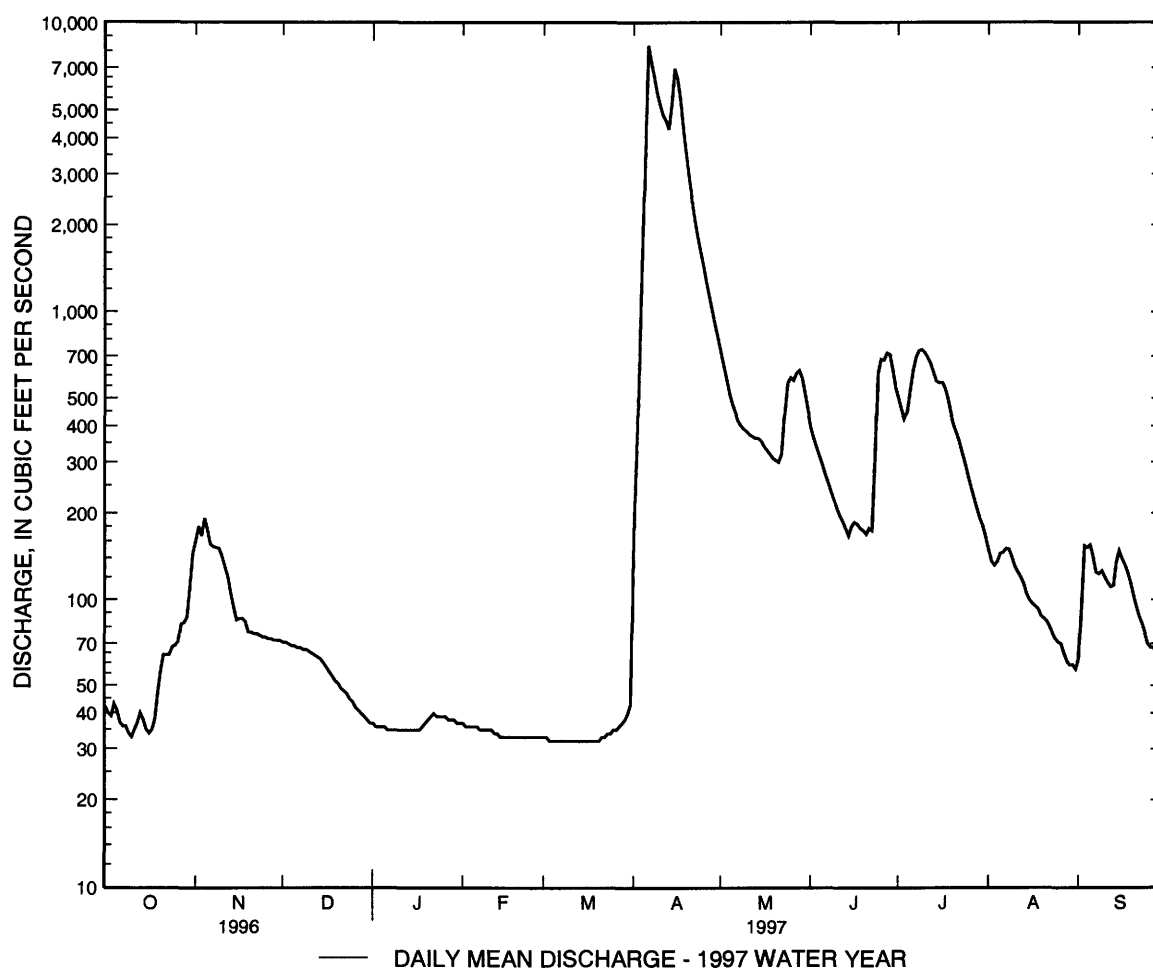
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	53.8	51.0	30.5	20.3	20.4	181	585	228	197	187	72.3	54.1
MAX	200	305	97.0	53.5	61.1	1308	3412	909	2138	2814	910	517
(WY)	1996	1972	1972	1994	1984	1966	1997	1986	1962	1975	1993	1944
MIN	5.48	8.74	4.75	.87	.76	2.26	33.5	27.2	15.1	2.23	.000	.79
(WY)	1940	1937	1938	1940	1940	1940	1931	1931	1934	1936	1936	1936

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1931 - 1997	
ANNUAL TOTAL	78213		156886		142	
ANNUAL MEAN	214		430		441	
HIGHEST ANNUAL MEAN					25.6	
LOWEST ANNUAL MEAN					13500	
HIGHEST DAILY MEAN	2680	Apr 13	8370	Apr 6	13500	Jul 2
LOWEST DAILY MEAN	21	Sep 19	32	Mar 3-20	.00 ^a	Jul 22
ANNUAL SEVEN-DAY MINIMUM	21	Sep 19	32	Mar 3	.00	Jul 28
INSTANTANEOUS PEAK FLOW					13600	
INSTANTANEOUS PEAK STAGE			27.02 ^b	Apr 6	27.10	Jul 2
INSTANTANEOUS LOW FLOW					.00	Jul 22
ANNUAL RUNOFF (AC-FT)	155100		311200		102600	
ANNUAL RUNOFF (CFMS)	.21		.41		.14	
ANNUAL RUNOFF (INCHES)	2.80		5.61		1.85	
10 PERCENT EXCEEDS	481		688		299	
50 PERCENT EXCEEDS	51		85		36	
90 PERCENT EXCEEDS	29		33		9.5	

a Occurred many times in 1936.

b Highwater mark, backwater from ice.



RED RIVER OF THE NORTH BASIN

05062500 WILD RICE RIVER AT TWIN VALLEY, MN

LOCATION.--Lat 47°16'00", long 96°14'40", in NW¼NE¼ sec. 27, T.144 N., R.44, Norman County, Hydrologic Unit 09020108, on left bank 100 ft upstream from highway bridge, 0.8 mi northeast of Twin Valley, and 2 mi upstream from small tributary.

DRAINAGE AREA.--929 mi² (updated, 1996).

PERIOD OF RECORD.--June 1909 to September 1917, July 1930 to September 1983, October 1989 to current year. Monthly discharge only for some periods, published in WSP 1308. October 1983 to September 1989, annual maximums only.

REVISED RECORDS.--WSP 955: 1941. WSP 1308: 1915(M), 1917(M).

GAGE.--Water-stage recorder. Datum of gage is 1,008.16 ft above mean sea level (U.S. Army Corps of Engineers bench mark). June 1909 to September 1917, nonrecording gage at site 0.2 mi downstream at different datum. July 23, 1930 to Nov. 24, 1934, nonrecording gage at highway bridge 100 ft downstream from present site at present datum. Nov. 25, 1934 to Aug. 2, 1950, water-stage recorder 80 ft upstream from present site at present datum.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Flow slightly regulated by Rice Lake and many other small lakes above station.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	41	218	e125	e98	e110	e110	e260	932	536	1180	343	139
2	40	155	e120	e98	e110	e110	e370	876	500	1190	323	135
3	41	224	e120	e98	e110	e110	e900	816	476	1170	325	135
4	41	281	e115	e100	e110	e110	e3800	754	463	1200	309	129
5	40	272	e115	e100	e115	e110	e5000	711	438	1120	296	124
6	39	267	e110	e100	e115	e110	e8200	672	400	1100	295	121
7	36	273	e110	e100	e115	e110	e4500	639	364	1010	295	121
8	36	277	e105	e100	e115	e110	e3400	636	331	983	282	124
9	38	273	e105	e100	e115	e110	e2900	633	308	944	265	121
10	37	266	e104	e100	e115	e110	e2700	630	290	917	257	122
11	37	e250	e100	e100	e115	e115	e2700	607	276	868	253	117
12	34	e250	e100	e100	e115	e120	2860	579	258	825	243	115
13	34	e240	e100	e100	e110	e120	3170	563	239	848	235	112
14	33	e230	e100	e100	e110	e120	3730	539	221	1120	225	113
15	30	e220	e98	e100	e110	e115	4080	515	202	1490	213	112
16	30	e230	e98	e100	e110	e115	3080	513	177	1490	215	117
17	36	e250	e98	e100	e110	e110	e2600	498	192	1260	212	121
18	44	e240	e98	e100	e110	e110	e2400	494	194	1090	202	119
19	46	e230	e98	e100	e110	e110	2180	475	185	958	194	111
20	62	e210	e98	e100	e110	e115	1960	457	183	868	193	105
21	86	e200	e98	e105	e105	e120	1780	437	174	797	193	102
22	87	e190	e98	e105	e105	e120	1620	415	165	737	179	97
23	76	e180	e98	e110	e105	e120	1500	543	185	678	170	94
24	78	e170	e98	e110	e105	e120	1380	812	255	627	165	93
25	75	e160	e98	e110	e105	e120	1450	980	370	583	160	89
26	55	e150	e98	e110	e105	e119	1350	914	532	544	153	85
27	56	e140	e98	e110	e110	e120	1190	816	527	508	148	84
28	53	e140	e98	e110	e110	e135	1080	736	422	468	149	91
29	85	e135	e98	e110	---	e150	1020	685	571	432	145	90
30	173	e130	e98	e110	---	e180	967	631	1390	399	140	97
31	227	---	e98	e110	---	e220	---	579	---	368	134	---
TOTAL	1826	6451	3195	3194	3090	3774	74127	20087	10824	27772	6905	3335
MEAN	58.9	215	103	103	110	122	2471	648	361	896	223	111
MAX	227	281	125	110	115	220	8200	980	1390	1490	343	139
MIN	30	130	98	98	105	110	260	415	165	368	134	84
AC-FT	3620	12800	6340	6340	6130	7490	147000	39840	21470	55090	13700	6610
CFSM	.06	.23	.11	.11	.12	.13	2.66	.70	.39	.96	.24	.12
IN.	.07	.26	.13	.13	.12	.15	2.97	.80	.43	1.11	.28	.13

e Estimated

RED RIVER OF THE NORTH BASIN

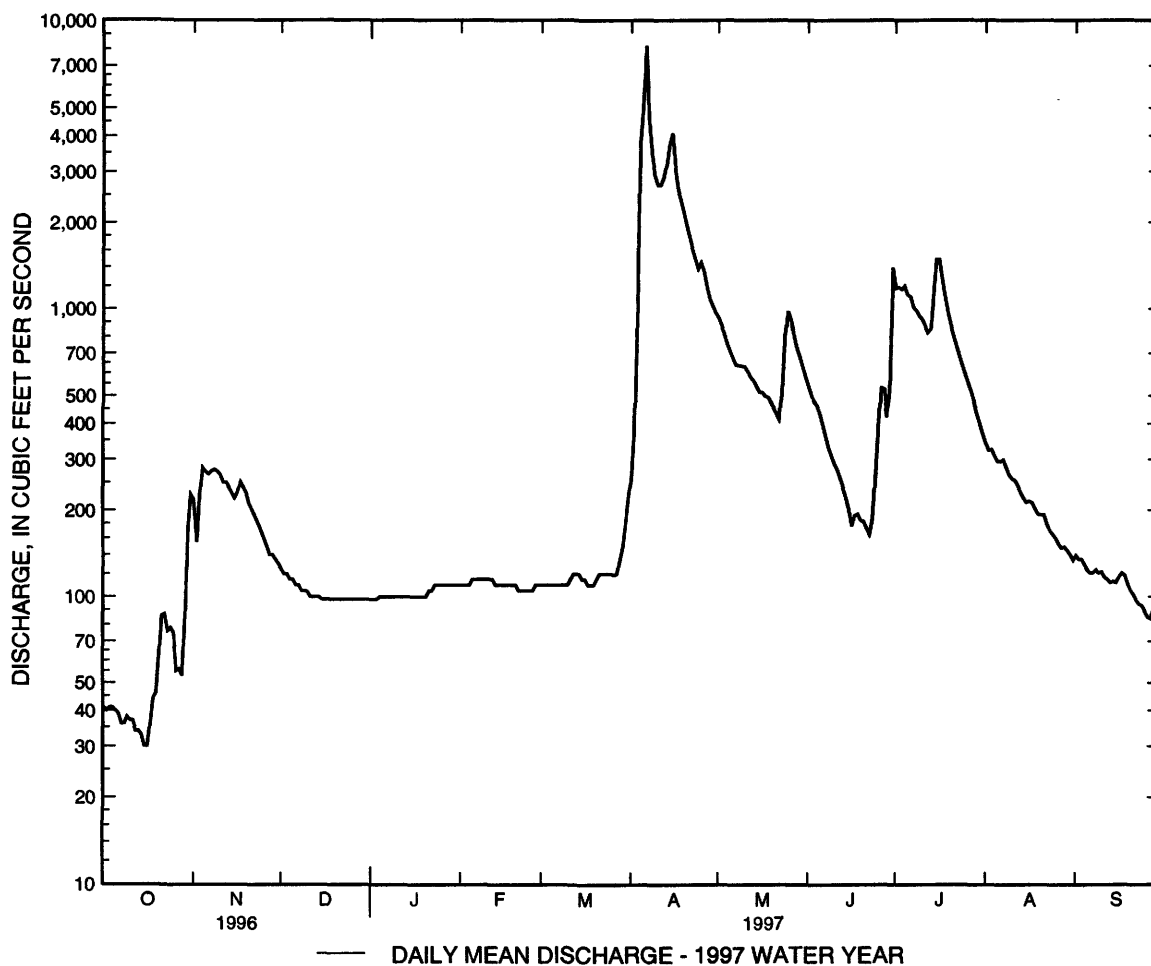
05062500 WILD RICE RIVER AT TWIN VALLEY, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	90.6	81.0	54.0	41.9	39.2	139	607	430	306	249	109	86.7
MAX	614	488	201	132	137	828	2471	2259	1564	1929	1024	788
(WY)	1974	1972	1995	1996	1996	1995	1997	1950	1943	1909	1993	1973
MIN	6.10	9.31	6.00	4.00	4.00	12.8	73.8	30.9	26.4	8.04	3.02	2.96
(WY)	1933	1933	1933	1933	1933	1940	1931	1977	1977	1934	1932	1936

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1909 - 1997
ANNUAL TOTAL	123521	164580	
ANNUAL MEAN	337	451	183 ^a
HIGHEST ANNUAL MEAN			500
LOWEST ANNUAL MEAN			22.7
HIGHEST DAILY MEAN	3700	8200	9100
LOWEST DAILY MEAN	22	30	1.1
ANNUAL SEVEN-DAY MINIMUM	24	33	1.3
INSTANTANEOUS PEAK FLOW		10000	10000
INSTANTANEOUS PEAK STAGE		15.91	20.00
INSTANTANEOUS LOW FLOW		29	.50
ANNUAL RUNOFF (AC-FT)	245000	326400	132700
ANNUAL RUNOFF (CFSM)	.36	.49	.20
ANNUAL RUNOFF (INCHES)	4.95	6.59	2.68
10 PERCENT EXCEEDS	1010	1080	478
50 PERCENT EXCEEDS	130	140	68
90 PERCENT EXCEEDS	36	96	15

a Median of annual mean discharges is 157 ft³/s.



RED RIVER OF THE NORTH BASIN

05064000 WILD RICE RIVER AT HENDRUM, MN

LOCATION.--Lat 47°16'05", long 96°47'50", in SE 1/4 SE 1/4 sec. 19, T.144 N., R.48 W., Norman County, Hydrologic Unit 09020108, on right bank 30 ft downstream from highway bridge, 0.5 mi east of Hendrum and 4 mi upstream from mouth.

DRAINAGE AREA.--1,600 mi², approximately.

PERIOD OF RECORD.--March 1944 to September 1984 and May 1985 to current year. Operated as a high-flow partial-record station October 1984 to April 1985.

REVISED RECORDS.--WSP 1728: 1958.

GAGE.--Water-stage recorder. Datum of gage is 836.75 ft above mean sea level (levels by U.S. Army Corps of Engineers). Prior to July 18, 1989, nonrecording gage at same site and datum.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Large part of high flow diverted into Marsh River Basin at overflow section 3.5 mi east of Ada. Another diversion into the Marsh River basin formed in 1947, 1.5 mi southeast of Ada and diverted water at all stages 1947-51, after which it was closed except for a small regulated flow diverted for abatement of contamination from Ada sewage plant effluent. Amount of diversion not known.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	53	264	e180	e135	e130	e120	e250	1760	812	1980	475	175
2	52	344	e175	e135	e130	e120	e350	1650	760	2260	442	179
3	50	284	e170	e135	e130	e120	e600	1600	739	2080	425	173
4	49	e260	e165	e135	e130	e120	e1200	1550	691	1950	420	169
5	e47	e310	e160	e135	e125	e120	e2600	1470	657	2030	398	166
6	e46	e350	e160	e135	e125	e120	e4000	1370	617	2020	399	159
7	e45	e350	e155	e130	e125	e120	e4800	1260	566	1850	392	157
8	e45	e340	e150	e130	e125	e120	e5200	1150	517	1690	383	164
9	e48	e350	e150	e130	e125	e120	e5600	1120	477	1640	368	171
10	e47	e350	e148	e130	e125	e120	e5900	1100	444	1570	348	161
11	e46	e350	e145	e130	e125	e125	e6600	1080	410	1450	330	160
12	e43	e340	e145	e130	e125	e130	e7200	1060	382	1350	320	158
13	e43	e330	e145	e130	e120	e130	e7800	1040	352	1500	309	156
14	e42	e320	e140	e130	e120	e130	8550	1030	321	2640	295	152
15	e42	e300	e140	e130	e120	e130	8930	1010	300	2970	283	153
16	e42	e290	e140	e130	e120	e125	9220	998	280	2940	279	166
17	e44	e310	e140	e130	e120	e120	10100	987	248	2750	279	172
18	e46	e320	e140	e130	e120	e120	10300	977	238	2360	272	176
19	50	e320	e140	e130	e120	e125	8980	964	255	1840	258	173
20	56	e310	e140	e130	e120	e130	7700	871	240	1500	250	166
21	58	e300	e140	e130	e120	e130	6610	757	232	1300	242	156
22	62	e280	e140	e135	e115	e130	5710	699	224	1120	238	149
23	83	e260	e140	e135	e115	e130	5040	680	273	982	230	149
24	92	e250	e140	e135	e115	e130	4450	1040	1210	886	219	144
25	87	e240	e140	e135	e115	e130	3860	1440	1900	807	207	134
26	91	e220	e140	e135	e115	e130	3240	1470	1690	745	202	133
27	97	e210	e135	e135	e114	e130	2650	1360	1470	692	193	133
28	82	e200	e135	e130	e120	e135	2160	1200	1280	644	184	124
29	94	e195	e135	e130	---	e145	1990	1070	1020	595	178	126
30	150	e190	e135	e130	---	e170	1870	975	1160	552	178	129
31	162	---	e135	e130	---	e200	---	890	---	511	175	---
TOTAL	1994	8737	4543	4090	3409	4025	153460	35628	19765	49204	9171	4683
MEAN	64.3	291	147	132	122	130	5115	1149	659	1587	296	156
MAX	162	350	180	135	130	200	10300	1760	1900	2970	475	179
MIN	42	190	135	130	114	120	250	680	224	511	175	124
AC-FT	3960	17330	9010	8110	6760	7980	304400	70670	39200	97600	18190	9290
CFSM	.04	.18	.09	.08	.08	.08	3.20	.72	.41	.99	.18	.10
IN.	.05	.20	.11	.10	.08	.09	3.57	.83	.46	1.14	.21	.11

e Estimated

RED RIVER OF THE NORTH BASIN

05064000 WILD RICE RIVER AT HENDRUM, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	128	117	69.1	51.0	49.3	287	1190	608	421	364	151	114
MAX	744	784	217	149	149	1485	5115	2074	1776	3136	1833	824
(WY)	1972	1972	1995	1996	1996	1966	1997	1985	1962	1975	1993	1973
MIN	.44	3.32	1.08	.092	.22	.46	106	56.1	9.15	8.82	1.07	.18
(WY)	1949	1949	1977	1977	1977	1949	1981	1977	1952	1951	1977	1948

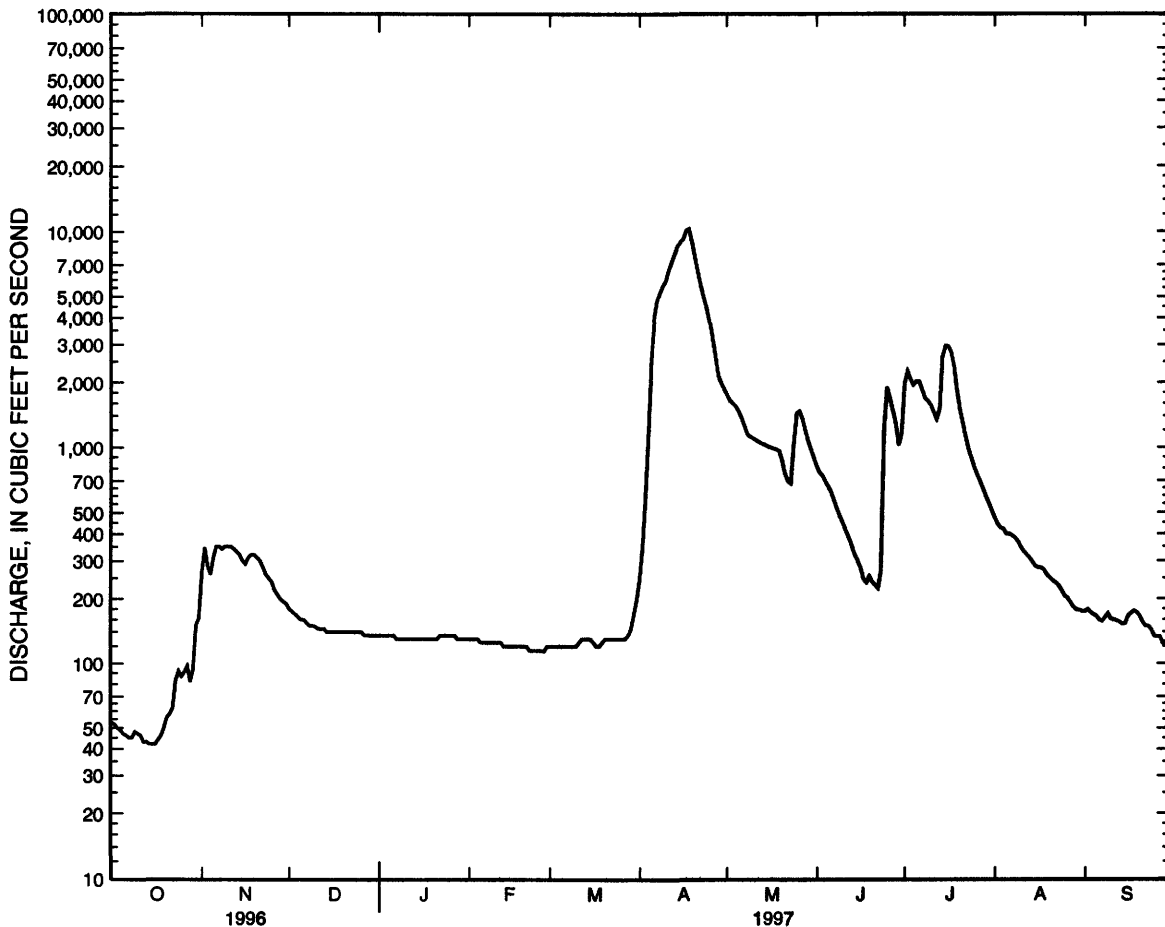
SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1944 - 1997
ANNUAL TOTAL	207976	298709	
ANNUAL MEAN	568	818	288 ^a
HIGHEST ANNUAL MEAN			818
LOWEST ANNUAL MEAN			28.9
HIGHEST DAILY MEAN	5680	10300	10300
LOWEST DAILY MEAN	34	42 ^b	.00
ANNUAL SEVEN-DAY MINIMUM	35	43 ^b	.00
INSTANTANEOUS PEAK FLOW		10600 ^c	10600
INSTANTANEOUS PEAK STAGE		33.85 ^d	33.85 ^d
ANNUAL RUNOFF (AC-FT)	412500	592500	208900
ANNUAL RUNOFF (INCHES)	4.84	6.94	2.45
10 PERCENT EXCEEDS	1690	1920	714
50 PERCENT EXCEEDS	150	179	90
90 PERCENT EXCEEDS	45	120	16

a Median of annual mean discharges is 259 ft³/s.

b Estimated value.

c From measurement of discharge.

d Backwater from Red River of the North.



— DAILY MEAN DISCHARGE - 1997 WATER YEAR

RED RIVER OF THE NORTH BASIN

05064500 RED RIVER OF THE NORTH AT HALSTAD, MN

LOCATION.--Lat 47°21'10", long 96°50'50", on line between secs.24 and 25, T.14S N., R.49 W., Trail County, Hydrologic Unit 09020107, on left bank on upstre side of highway bridge, 0.5 mi west of Halstad, 2.5 mi downstream from Wild Rice River, and at mile 375.2.

DRAINAGE AREA.--21,800 mi², approximately, including 3,800 mi² in closed basins.

PERIOD OF RECORD.--April 1936 to June 1937 (no winter records), April 1942 to September 1960 (spring and summer months only), May 1961 to current year

REVISED RECORDS.--WSP 1388: 1936, 1950. WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 826.65 ft above sea level. Prior to July 17, 1961, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods of estimated discharges, which are poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1897 reached a stage of about 38.5 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	492	986	e900	e750	e1050	e1650	e3000	36900	5740	5570	2220	1190
2	485	884	e900	e760	e1070	e1700	e4000	34500	5560	6890	2160	1290
3	500	1020	e900	e760	e1100	e1700	e6000	31900	5530	6900	2130	1350
4	495	951	e900	e780	e1120	e1750	e10000	29700	5330	6520	2140	1290
5	485	931	e860	e780	e1140	e1800	e16000	28000	5100	6100	2070	1290
6	485	1080	e820	e780	e1150	e1800	e21000	26600	4820	5650	2030	1290
7	488	1240	e780	e780	e1180	e1800	e23000	25200	4570	5290	2170	1250
8	493	1250	e740	e760	e1200	e1850	e24000	23800	4440	5160	2050	1270
9	522	1170	e700	e750	e1200	e1850	e26000	22200	4430	5080	1850	1410
10	558	1050	e660	e720	e1200	e1850	e28000	20600	4360	4950	1750	1420
11	538	e780	e640	e680	e1200	e1850	e30000	18800	4190	4800	1690	1330
12	478	e740	e620	e660	e1200	e1850	e34000	17200	4000	4740	1640	1310
13	434	e680	e600	e660	e1200	e1850	e37000	15500	3820	5700	1610	1290
14	383	e630	e600	e700	e1200	e1900	e42000	14000	3640	8770	1570	1240
15	328	e600	e600	e720	e1200	e1900	e44000	12800	3500	8890	1550	1090
16	282	e600	e630	e720	e1200	e1900	e45000	11700	3440	7690	1530	950
17	258	e650	e650	e700	e1200	e1900	e55000	10800	3350	6800	1510	963
18	263	e700	e680	e700	e1250	e1900	e64000	9960	3250	5960	1480	1180
19	276	e740	e700	e720	e1250	e1900	69900	9110	3160	5070	1440	1260
20	306	e750	e720	e760	e1300	e1900	69900	8210	3080	4460	1400	1220
21	290	e750	e740	e800	e1350	e1900	66200	7340	3030	3950	1380	1160
22	315	e700	e730	e820	e1400	e1900	61300	6720	2880	3590	1370	1120
23	410	e650	e720	e820	e1450	e2000	57000	6400	3270	3330	1360	1090
24	482	e650	e680	e850	e1500	e2000	53400	6880	6480	3130	1330	1040
25	500	e700	e660	e850	e1550	e2000	50200	7610	9380	2980	1300	994
26	508	e750	e680	e880	e1550	e2000	47300	7580	8750	2850	1290	981
27	547	e780	e720	e930	e1550	e2000	44600	7200	7240	2750	1280	1020
28	643	e800	e740	e980	e1600	e2100	42400	6800	6160	2660	1260	1050
29	731	e840	e740	e1000	---	e2200	40700	6480	5140	2550	1250	1030
30	825	e880	e750	e1030	---	e2400	38900	6210	4780	2440	1250	1040
31	1030	---	e750	e1040	---	e2500	---	5990	---	2320	1210	---
TOTAL	14830	24932	22510	24640	35560	59600	1153800	482690	142420	153540	50270	35408
MEAN	478	831	726	795	1270	1923	38460	15570	4747	4953	1622	1180
MAX	1030	1250	900	1040	1600	2500	69900	36900	9380	8890	2220	1420
MIN	258	600	600	660	1050	1650	3000	5990	2880	2320	1210	950
AC-FT	29420	49450	44650	48870	70530	118200	2289000	957400	282500	304500	99710	70230

e Estimated

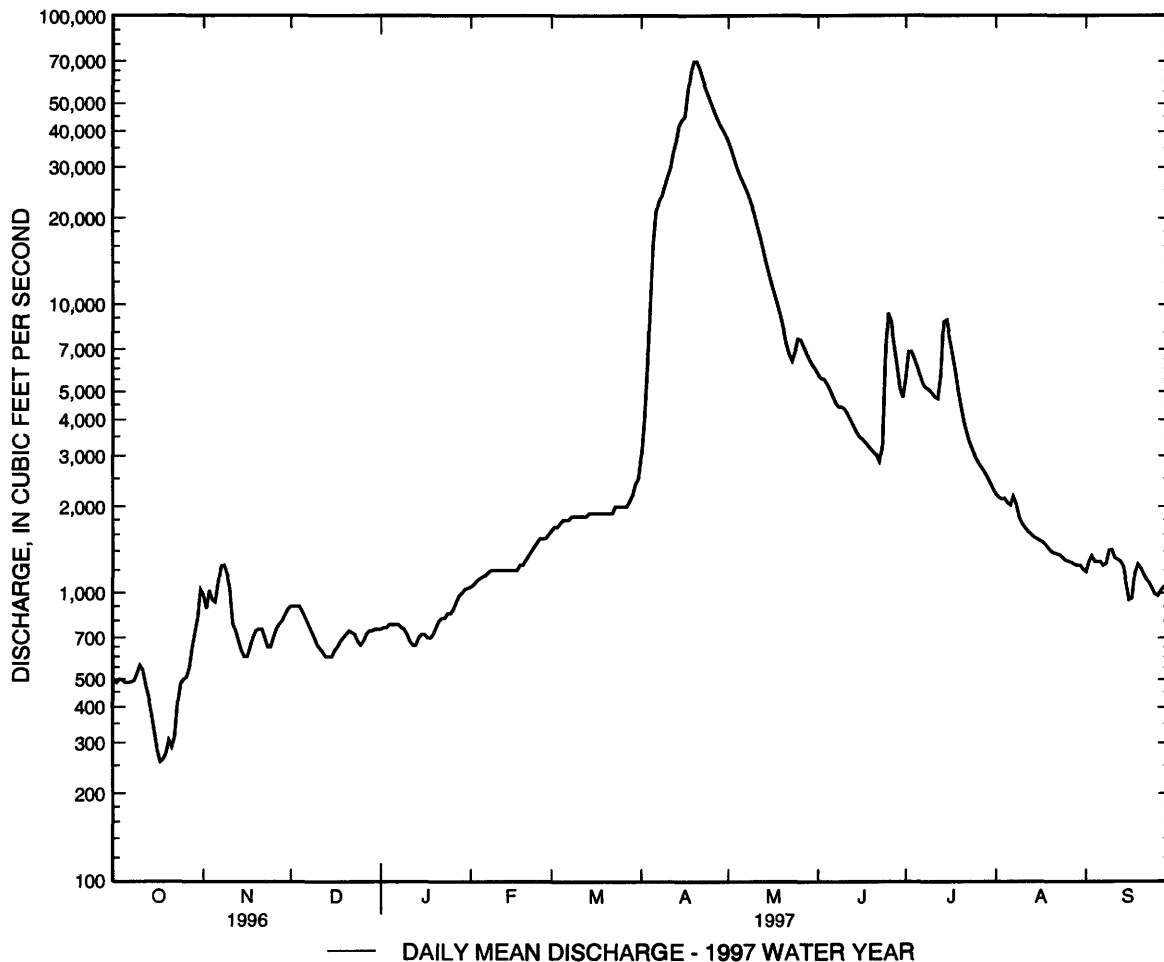
RED RIVER OF THE NORTH BASIN

05064500 RED RIVER OF THE NORTH AT HALSTAD, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	S ^{OP}
MEAN	791	714	551	465	490	2296	7870	3681	2634	2634	1124	721
MAX	2875	1843	1253	1023	1270	9444	38460	15570	10310	20060	11700	3560
(WY)	1995	1995	1987	1987	1997	1995	1997	1997	1962	1975	1993	1993
MIN	61.5	92.3	51.2	32.1	45.9	249	705	449	242	153	59.5	37.4
(WY)	1977	1977	1977	1977	1977	1962	1981	1977	1977	1988	1977	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1961 - 1997
ANNUAL TOTAL	1136591	2200200	
ANNUAL MEAN	3105	6028	2011
HIGHEST ANNUAL MEAN			6028
LOWEST ANNUAL MEAN			214
HIGHEST DAILY MEAN	25100	Apr 18	69900
LOWEST DAILY MEAN	228	Sep 22	10
ANNUAL SEVEN-DAY MINIMUM	256	Sep 19	17
INSTANTANEOUS PEAK FLOW		71500	Apr 19
INSTANTANEOUS PEAK STAGE		40.74	Apr 19
INSTANTANEOUS LOW FLOW		258	Oct 17
ANNUAL RUNOFF (AC-FT)	2254000	4364000	1457000
10 PERCENT EXCEEDS	8300	17800	4320
50 PERCENT EXCEEDS	900	1380	783
90 PERCENT EXCEEDS	496	642	213



RED RIVER OF THE NORTH BASIN

05064500 RED RIVER OF THE NORTH AT HALSTAD, MN--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1961-67, 1972 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LILITY LAB (MG/L AS CACO3) (90410)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)
OCT 07...	1245	480	502	--	5.5	7.5	--	--	--	--
NOV 14...	1130	633	--	--	-6.0	0.5	--	--	--	--
JAN 14...	1515	703	--	--	-18.0	0.0	--	--	--	--
APR a21...	1800	69200	330	7.5	12.5	12.0	140	104	34	14
26...	1440	44300	390	--	--	--	--	--	--	--
30...	1315	41300	460	--	4.0	10.5	--	--	--	--
MAY 14...	1155	14100	650	--	11.5	11.0	--	--	--	--
SEP 15...	1015	1090	687	8.2	15.0	18.0	290	247	57	35
DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
APR a21...	11	14	0.4	5.3	60	5.0	0.20	192	214	0.29
SEP 15...	35	21	0.9	6.5	110	26	0.20	418	438	0.60
DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
APR a21...	40000	3	20	<1.0	20	10	<0.1	<1.0	<1	170
SEP 15...	1290	4	50	<1.0	40	10	<0.1	<1.0	1	230

a Replicate sample also collected for quality-assurance purposes.

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RED RIVER OF THE NORTH BASIN

05067500 MARSH RIVER NEAR SHELLY, MN

LOCATION.--Lat 47°24'45", long 96°45'50", in NE 1/4 NW 1/4 sec. 3, T.14S N., R.48 W., Norman County, Hydrologic Unit 09020107, near center of span on downstream truss of bridge, 3.8 mi southeast of Shelly and 10 mi upstream from mouth.

DRAINAGE AREA.--151 mi².

PERIOD OF RECORD.--March 1944 to September 1983 and April 1985 to current year (no winter records since 1989). Monthly discharge only for March 1944, published in WSP 1308. Operated as a high-flow partial-record station October 1983 to March 1985.

GAGE.--Water-stage recorder. Datum of gage is 841.14 ft above mean sea level (levels by U.S. Army Corps of Engineers). Prior to Oct. 1, 1965, nonrecording gage at datum 3.0 ft higher. Oct. 1, 1965 to May 17, 1989, nonrecording gage at present site and datum.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Large part of high flow of Wild Rice River diverted into Marsh River basin at overflow section 4.6 mi east of Ada. Another diversion from Wild Rice River basin formed in 1947, 1.5 mi southeast of Ada and diverted water at all stages 1947-51, after which it was closed except for a small regulated flow diverted for abatement of pollution from Ada sewage plant effluent.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	---	---	---	---	---	e.20	e170	38	409	4.5	1.5
2	.00	---	---	---	---	---	e6.0	e140	33	567	4.0	1.3
3	.00	---	---	---	---	---	e60	e120	34	505	3.7	.94
4	.00	---	---	---	---	---	e260	e110	43	635	3.1	.70
5	.00	---	---	---	---	---	e450	e100	42	634	3.0	.79
6	.00	---	---	---	---	---	e700	e90	35	470	3.2	.64
7	.00	---	---	---	---	---	e1250	e81	28	349	3.5	.49
8	.00	---	---	---	---	---	e1700	e76	22	304	4.8	.67
9	.00	---	---	---	---	---	e2100	74	17	281	4.9	.30
10	.00	---	---	---	---	---	e2300	67	13	244	4.3	1.8
11	.00	---	---	---	---	---	e2200	62	9.5	210	3.9	2.5
12	.00	---	---	---	---	---	e1600	59	6.7	156	3.5	2.2
13	.00	---	---	---	---	---	e1500	49	5.6	147	3.1	2.0
14	.00	---	---	---	---	---	e1400	43	4.6	407	2.6	1.5
15	.00	---	---	---	---	---	e1600	41	4.4	672	2.5	1.3
16	.00	---	---	---	---	---	e3300	37	3.7	643	2.4	1.3
17	.04	---	---	---	---	---	e4000	33	3.5	402	2.0	1.2
18	.04	---	---	---	---	---	e4100	30	4.2	206	1.8	1.2
19	.04	---	---	---	---	---	e3000	27	3.9	116	2.1	1.7
20	.02	---	---	---	---	---	e2000	25	3.3	90	2.3	1.5
21	.00	---	---	---	---	---	e1400	22	2.7	76	2.1	1.3
22	.00	---	---	---	---	---	e1100	21	2.4	63	2.2	1.1
23	.00	---	---	---	---	---	e900	56	3.0	47	2.5	1.2
24	.00	---	---	---	---	---	e740	161	526	34	2.2	1.2
25	.00	---	---	---	---	---	e550	241	1740	24	1.9	1.2
26	.04	---	---	---	---	---	e300	194	1990	17	1.7	1.2
27	.36	---	---	---	---	---	e200	121	1670	13	1.4	1.1
28	.33	---	---	---	---	---	e180	89	1180	10	1.2	1.7
29	.41	---	---	---	---	---	e180	70	845	7.9	1.0	2.0
30	1.6	---	---	---	---	---	e200	58	552	6.3	.96	2.4
31	1.3	---	---	---	---	---	---	47	---	5.2	.85	---
TOTAL	4.18	---	---	---	---	---	39276.20	2514	8865.5	7750.4	83.21	39.93
MEAN	.13	---	---	---	---	---	1309	81.1	296	250	2.68	1.33
MAX	1.6	---	---	---	---	---	4100	241	1990	672	4.9	2.5
MIN	.00	---	---	---	---	---	.20	21	2.4	5.2	.85	.30
AC-FT	8.3	---	---	---	---	---	77900	4990	17580	15370	165	79
CFSM	.00	---	---	---	---	---	8.67	.54	1.96	1.66	.02	.01
IN.	.00	---	---	---	---	---	9.68	.62	2.18	1.91	.02	.01

e Estimated

RED RIVER OF THE NORTH BASIN

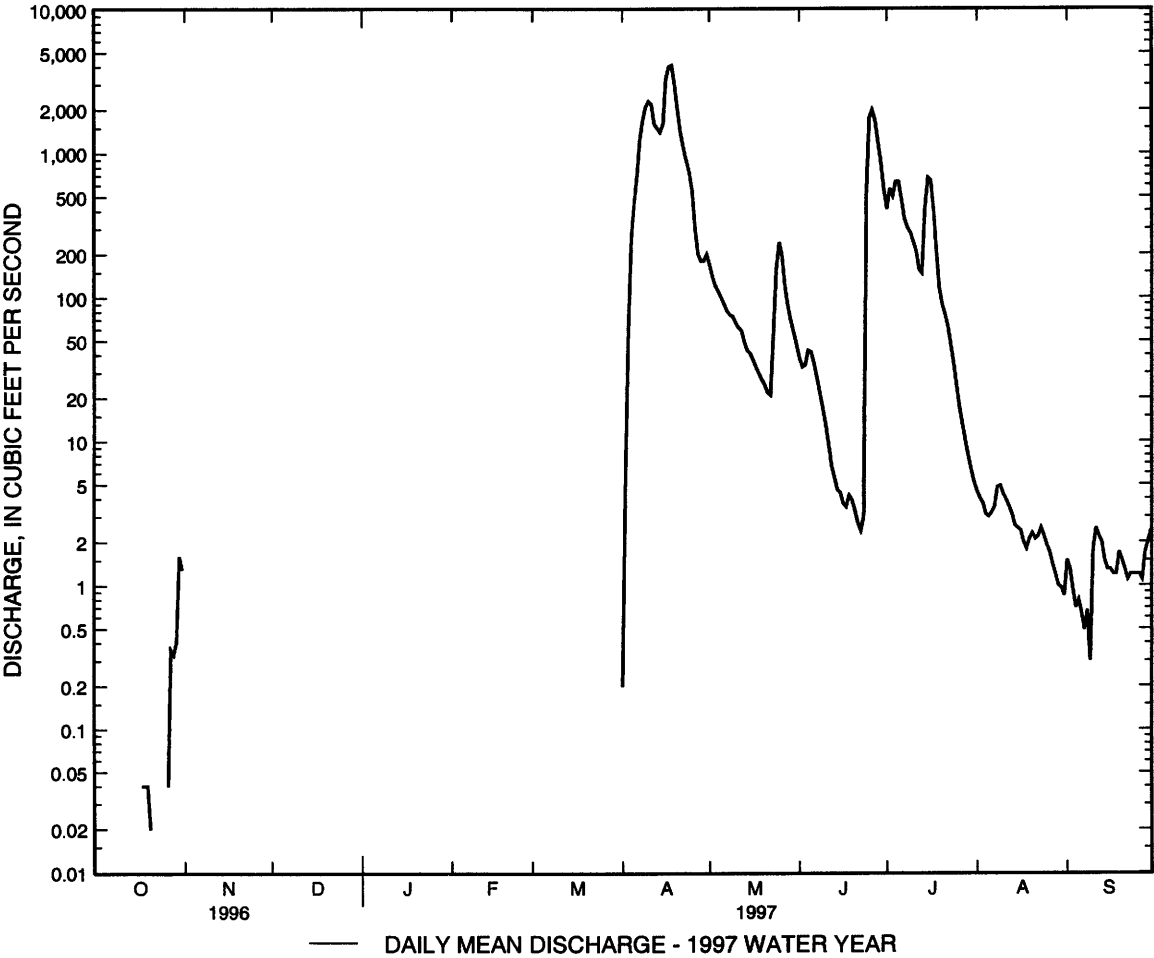
05067500 MARSH RIVER NEAR SHELLY, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	S ND
MEAN	13.1	11.0	5.60	3.79	3.29	76.7	311	126	83.0	77.4	19.7	12.5
MAX	130	102	77.1	64.5	62.1	437	1537	2617	1030	821	363	144
(WY)	1952	1952	1951	1951	1951	1945	1950	1950	1950	1950	1949	1944
MIN	.000	.000	.000	.000	.000	.000	.078	.87	.000	.000	.000	.000
(WY)	1955	1956	1956	1946	1946	1964	1981	1980	1980	1961	1959	1954

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1944 - 1997	
ANNUAL MEAN					63.3 ^a	
HIGHEST ANNUAL MEAN					543 ^a	1950
LOWEST ANNUAL MEAN					1.24 ^a	1977
HIGHEST DAILY MEAN	2080	Apr 15	4100	Apr 18	4740	Apr 19 1979
LOWEST DAILY MEAN	.00 ^b		.00 ^b		.00 ^c	
ANNUAL SEVEN-DAY MINIMUM	.00	Aug 24	.00	Oct 1	.00	Sep 12 1945
INSTANTANEOUS PEAK FLOW			4300	Apr 18	4880 ^d	Apr 19 1979
INSTANTANEOUS PEAK STAGE			25.45 ^e	Apr 18	25.45 ^e	Apr 18 1997

- a Based on complete water years only, 1945-83, 86-89.
- b Many days.
- c Many days, most years.
- d Gage height, 23.36 ft, from floodmark.
- e From floodmark.



RED RIVER OF THE NORTH BASIN

05069000 SAND HILL RIVER AT CLIMAX, MN

LOCATION.--Lat 47°36'43", long 96°48'52", in NE1/4NE1/4 sec. 30, T.148 N., R.48 W., Polk County, Hydrologic Unit 09020301, on left bank 25 ft upstream from bridge on U.S. Highway 75 in Climax and 3.7 mi upstream from mouth.

DRAINAGE AREA.--426 mi².

PERIOD OF RECORD.--March 1943 to September 1984, June 1985 to current year (winter records incomplete prior to 1947). Monthly discharge only for some periods, published in WSP 1308 and 1728. October 1984 to May 1985, operated as a high-flow partial-record station.

REVISED RECORDS.--WSP 1388: 1943(M), 1944, 1947(M). WSP 1728: 1951(M), 1960 (Average discharge).

GAGE.--Water stage recorder. Datum of gage is 820.10 ft above mean sea level (levels by U.S. Army Corps of Engineers). Prior to Oct. 1, 1966, nonrecording gage at site 3.2 mi upstream at datum 12.78 ft higher. Oct. 1, 1966 to Sept 5, 1989, nonrecording gage at present site and datum.

REMARKS.--Records fair except those for estimated daily discharges, which are poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

	DAILY MEAN VALUES											
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	37	e30	e25	e23	e23	e76	e435	112	641	10 ^c	36
2	e19	37	e31	e26	e23	e22	e130	362	98	1320	9 ^c	36
3	e19	48	e31	e26	e23	e22	e220	297	108	1490	92	36
4	22	48	e30	e26	e23	e22	e382	231	116	1390	8 ^c	36
5	23	45	e30	e26	e22	e21	e540	171	107	1160	8 ^c	36
6	21	49	e29	e25	e22	e21	e660	170	98	850	8 ^c	37
7	e21	54	e29	e25	e22	e21	e740	181	87	685	8 ^c	36
8	21	46	e28	e25	e22	e21	e740	190	77	592	7 ^c	42
9	21	39	e28	e24	e21	e21	e720	198	69	536	6 ^c	56
10	24	47	e28	e24	e21	e22	e720	206	61	494	6 ^c	44
11	21	46	e27	e24	e21	e23	e720	196	57	457	5 ^c	41
12	20	41	e27	e23	e21	e23	e800	182	53	446	55	40
13	21	38	e27	e23	e21	e23	e960	e168	48	455	51	40
14	19	e35	e28	e23	e21	e23	e1200	e152	42	418	5 ^c	84
15	17	e33	e28	e23	e21	e22	e1500	e137	41	383	52	61
16	17	e33	e27	e23	e21	e22	e2000	109	45	349	5 ^c	45
17	18	e36	e27	e23	e21	e22	e2700	105	40	322	53	46
18	22	e36	e28	e23	e21	e23	3410	101	37	303	4 ^c	46
19	28	e34	e28	e23	e22	e24	3940	96	35	283	52	41
20	24	e32	e28	e24	e23	e25	4360	91	35	268	6 ^c	39
21	23	e31	e28	e25	e23	e26	4310	88	33	254	6 ^c	37
22	e23	e30	e27	e25	e23	e26	e3920	87	30	236	6 ^c	35
23	e24	e29	e27	e25	e22	e26	e3300	137	33	221	55	33
24	26	e29	e26	e24	e21	e26	e2590	212	164	207	53	31
25	25	e28	e26	e23	e21	e26	e1960	208	858	192	51	32
26	27	e28	e26	e23	e22	e25	e1440	193	773	180	47	32
27	28	e27	e26	e23	e23	e25	e1040	179	610	166	4 ^c	32
28	e29	e27	e26	e23	e23	e26	e773	164	569	150	43	32
29	29	e27	e25	e23	---	e28	e642	152	559	135	40	36
30	27	e28	e25	e23	---	e30	e534	139	581	122	40	35
31	36	---	e25	e23	---	e40	---	126	---	112	3 ^c	---
TOTAL	715	1098	856	744	613	750	47027	5463	5576	14817	192 ^c	1213
MEAN	23.1	36.6	27.6	24.0	21.9	24.2	1568	176	186	478	62.2	40.4
MAX	36	54	31	26	23	40	4360	435	858	1490	10 ^c	84
MIN	17	27	25	23	21	21	76	87	30	112	39	31
AC-FT	1420	2180	1700	1480	1220	1490	93280	10840	11060	29390	383 ^c	2410
CFSM	.05	.09	.06	.06	.05	.06	3.68	.41	.44	1.12	.15	.09
IN.	.06	.10	.07	.06	.05	.07	4.11	.48	.49	1.29	.17	.11

e Estimated

RED RIVER OF THE NORTH BASIN

05069000 SAND HILL RIVER AT CLIMAX, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1997, BY WATER YEAR (WY)

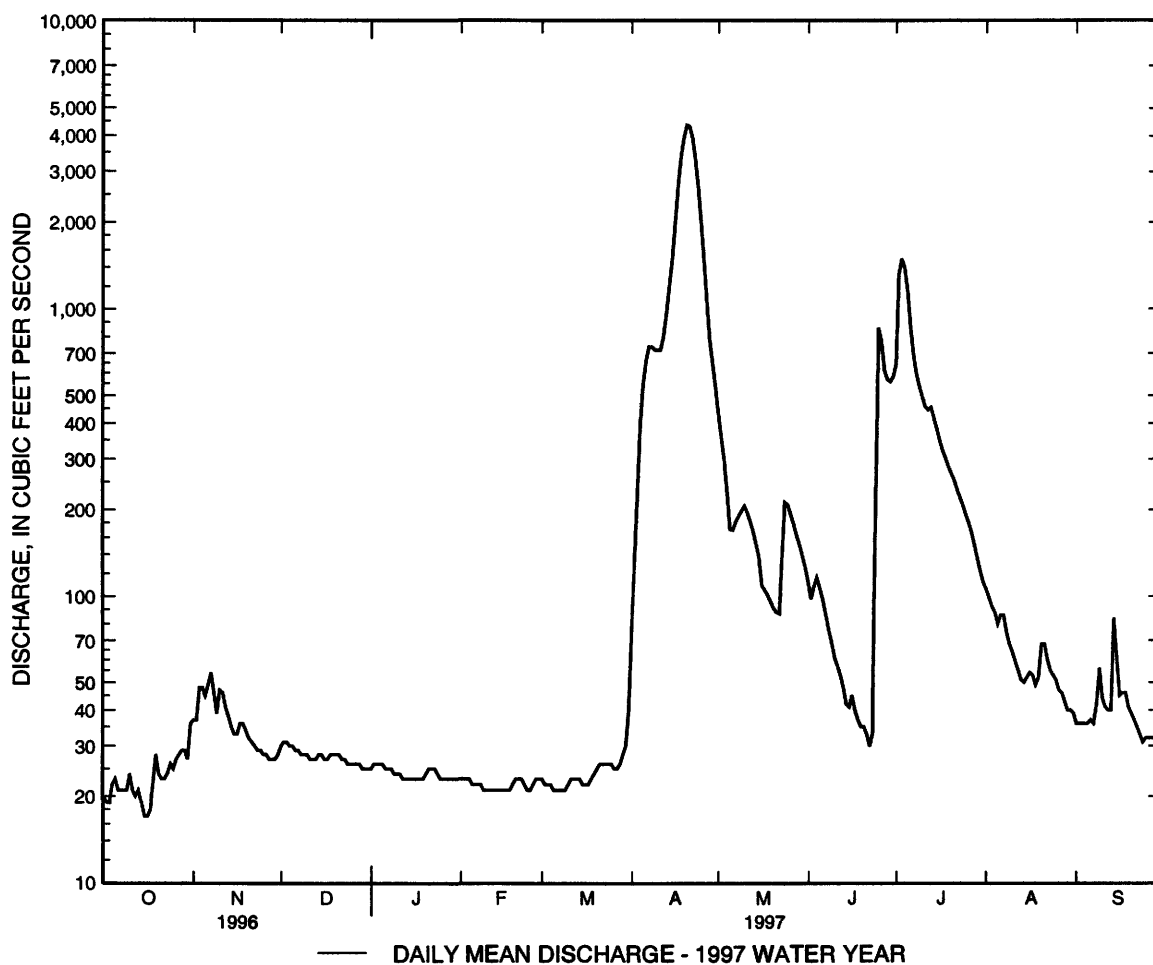
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	35.4	29.0	17.9	13.2	13.0	79.7	378	124	96.1	79.0	38.4	27.2
MAX	223	209	48.7	31.5	46.8	455	1568	1156	596	478	426	124
(WY)	1972	1972	1972	1996	1984	1995	1997	1950	1984	1997	1993	1994
MIN	9.43	8.64	5.11	2.02	3.55	5.81	25.3	23.7	11.5	8.95	6.30	6.49
(WY)	1977	1956	1964	1962	1962	1948	1981	1958	1980	1980	1961	1955

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1943 - 1997
ANNUAL TOTAL	56849	80801	
ANNUAL MEAN	155	221	77.5 ^a
HIGHEST ANNUAL MEAN			221
LOWEST ANNUAL MEAN			18.4
HIGHEST DAILY MEAN	4230	4360 ^b	4360 ^b
LOWEST DAILY MEAN	13	17	1.0
ANNUAL SEVEN-DAY MINIMUM	14	19	1.1
INSTANTANEOUS PEAK FLOW		4360 ^b	4560
INSTANTANEOUS PEAK STAGE		39.40 ^c	39.40 ^c
ANNUAL RUNOFF (AC-FT)	112800	160300	56110
ANNUAL RUNOFF (CFMS)	.36	.52	.18
ANNUAL RUNOFF (INCHES)	4.96	7.06	2.47
10 PERCENT EXCEEDS	224	574	154
50 PERCENT EXCEEDS	30	36	23
90 PERCENT EXCEEDS	18	22	9.0

a Median of annual mean discharges is 62 ft³/s.

b Estimated daily discharge, backwater from Red River of the North.

c Backwater from Red River of the North.



RED RIVER OF THE NORTH BASIN

05073500 UPPER RED LAKE AT WASKISH, MN

LOCATION.--Lat 48°10'32", long 94°30'51", in NW¹/₄SW¹/₄NE¹/₄NW¹/₄ sec. 8, T.154 N., R. 30 W., Beltrami County, Hydrologic Unit 020302, on east side of Upper Red Lake, near mouth of Tamarack River, on Minnesota Department of Natural Resources property, 500 feet west of State Highway 72 bridge on north edge of Waskish.

PERIOD OF RECORD.-- October 1921 to September 1933, May 1940 to July 1946, October 1995 to current year.

GAGE.-- Water-stage recorder. Datum of gage is 1,100.00 ft, adjustment of 1912. October 1921 to September 1929, nonrecording gage at datum 1170.00 ft (no winter readings). April 1930 to September 1933, nonrecording gage at datum 1100.00 ft (some winter readings). May 1940 to July 1946, nonrecording gage at datum 1170.00 ft.

REMARKS.-- Water level subject to fluctuation caused by seiches.

EXTREMES FOR PERIOD OF RECORD.-- Maximum elevation, 78.34 ft, June 28, 1943; minimum recorded, 72.10 ft, Oct. 17, 1932.

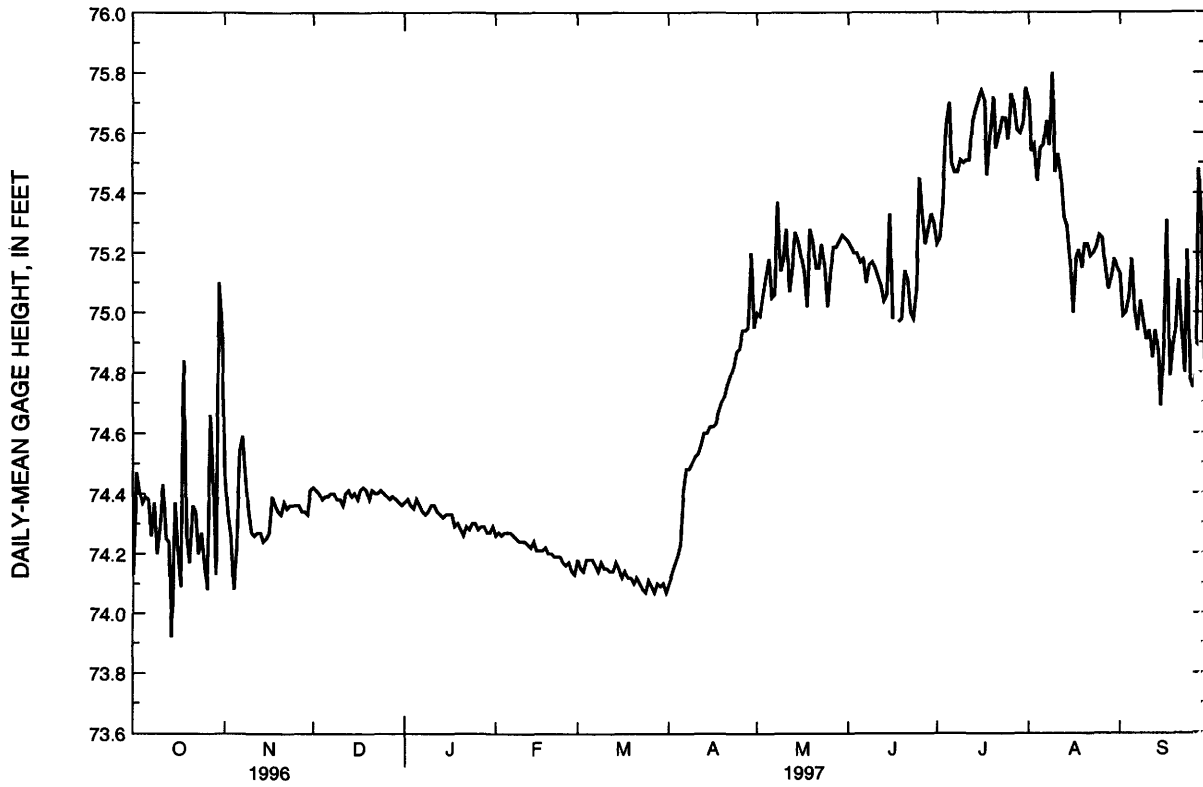
EXTREMES FOR CURRENT YEAR.-- Maximum elevation, 76.27 ft, July 5, maximum daily, 75.80 ft, Aug. 9; minimum elevation, 73.47 ft, Oct. 17, minimum daily, 73.92 ft., Oct. 14.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	74.13	74.47	74.42	74.37	74.26	74.18	74.10	75.00	75.24	75.23	75.71	75.13
2	74.47	74.33	74.41	74.38	74.27	74.15	74.13	74.99	75.22	75.25	75.54	74.99
3	74.41	74.26	74.40	74.36	74.26	74.14	74.16	75.06	75.20	75.36	75.56	75.00
4	74.37	74.08	74.38	74.35	74.27	74.18	74.19	75.12	75.20	75.63	75.44	75.05
5	74.39	74.21	74.39	74.38	74.27	74.18	74.23	75.18	75.17	75.70	75.55	75.18
6	74.38	74.54	74.39	74.36	74.27	74.18	74.40	75.05	75.18	75.50	75.56	75.01
7	74.26	74.59	74.40	74.34	74.26	74.16	74.48	75.06	75.10	75.47	75.64	74.94
8	74.37	74.46	74.40	74.33	74.25	74.14	74.48	75.37	75.16	75.47	75.56	75.04
9	74.20	74.34	74.38	74.34	74.24	74.17	74.50	75.14	75.17	75.51	75.87	74.97
10	74.29	74.27	74.38	74.36	74.24	74.15	74.52	75.18	75.15	75.50	75.47	74.91
11	74.43	74.26	74.36	74.36	74.24	74.15	74.53	75.28	75.12	75.51	75.57	74.94
12	74.25	74.27	74.40	74.34	74.23	74.14	74.56	75.07	75.09	75.51	75.46	74.85
13	74.24	74.27	74.41	74.33	74.22	74.14	74.60	75.15	75.04	75.64	75.32	74.94
14	73.92	74.24	74.39	74.32	74.24	74.17	74.60	75.27	75.06	75.68	75.27	74.87
15	74.37	74.25	74.40	74.33	74.21	74.15	74.62	75.24	75.33	75.71	75.18	74.69
16	74.22	74.27	74.38	74.33	74.21	74.12	74.62	75.19	74.98	75.74	75.07	74.93
17	74.09	74.39	74.41	74.33	74.21	74.14	74.63	75.14	---	75.71	75.18	75.31
18	74.84	74.36	74.42	74.29	74.22	74.12	74.67	75.02	74.97	75.46	75.21	74.79
19	74.26	74.34	74.41	74.30	74.20	74.12	74.70	75.28	74.98	75.60	75.15	74.89
20	74.17	74.33	74.38	74.28	74.20	74.10	74.72	75.24	75.14	75.72	75.27	74.94
21	74.36	74.37	74.41	74.26	74.19	74.12	74.76	75.15	75.11	75.55	75.27	75.11
22	74.34	74.35	74.40	74.29	74.19	74.10	74.79	75.15	75.00	75.60	75.19	74.96
23	74.20	74.36	74.40	74.28	74.19	74.08	74.82	75.23	74.98	75.65	75.27	74.80
24	74.27	74.36	74.41	74.30	74.17	74.07	74.87	75.15	75.08	75.65	75.22	75.21
25	74.17	74.36	74.40	74.30	74.16	74.11	74.88	75.02	75.45	75.58	75.26	74.78
26	74.08	74.36	74.39	74.28	74.17	74.09	74.94	75.14	75.33	75.73	75.26	74.75
27	74.66	74.34	74.38	74.29	74.14	74.07	74.94	75.22	75.23	75.69	75.15	74.80
28	74.44	74.34	74.39	74.29	74.13	74.10	74.95	75.22	75.28	75.61	75.07	75.48
29	74.13	74.33	74.38	74.27	---	74.09	75.20	75.24	75.33	75.60	75.12	75.29
30	75.10	74.41	74.37	74.27	---	74.10	74.95	75.26	75.30	75.63	75.18	74.75
31	74.97	---	74.36	74.29	---	74.07	---	75.25	---	75.75	75.15	---
MEAN	74.35	74.34	74.39	74.32	74.22	74.13	74.62	75.16	75.16	75.58	75.34	74.98
MAX	75.10	74.59	74.42	74.38	74.27	74.18	75.20	75.37	75.45	75.75	75.87	75.48
MIN	73.92	74.08	74.36	74.26	74.13	74.07	74.10	74.99	74.97	75.23	75.07	74.69

RED RIVER OF THE NORTH BASIN
05073500 UPPER RED LAKE AT WASKISH, MN--Continued



RED RIVER OF THE NORTH BASIN

05073650 LOWER RED LAKE AT BATTLE RIVER MOUTH NEAR SAUM, MN

LOCATION.-- Lat 47°57'35", long 94°44'31", in NW¹/₄SE¹/₄NW¹/₄NW¹/₄ sec. 28, T. 152 N., R. 32 W., Beltrami County, Hydrologic Unit 09020302, on east side of Lower Red Lake, near mouth of Battle River, 900 feet southwest of highway bridge, and 2.3 mi southwest of Saum.

PERIOD OF RECORD.--June 5, 1996 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,100.00 ft, adjustment of 1912.

REMARKS.--Water level subject to fluctuation caused by seiches.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 75.83 ft, July 14, 1997; minimum recorded, 73.92 ft, Mar. 29, 1997.

EXTREMES FOR CURRENT YEAR.-- Maximum elevation, 75.83 ft, July 14, maximum daily, 75.60 ft, July 20; minimum elevation, 73.92 ft, Mar. 29, minimum daily, 73.94 ft, Mar. 31.

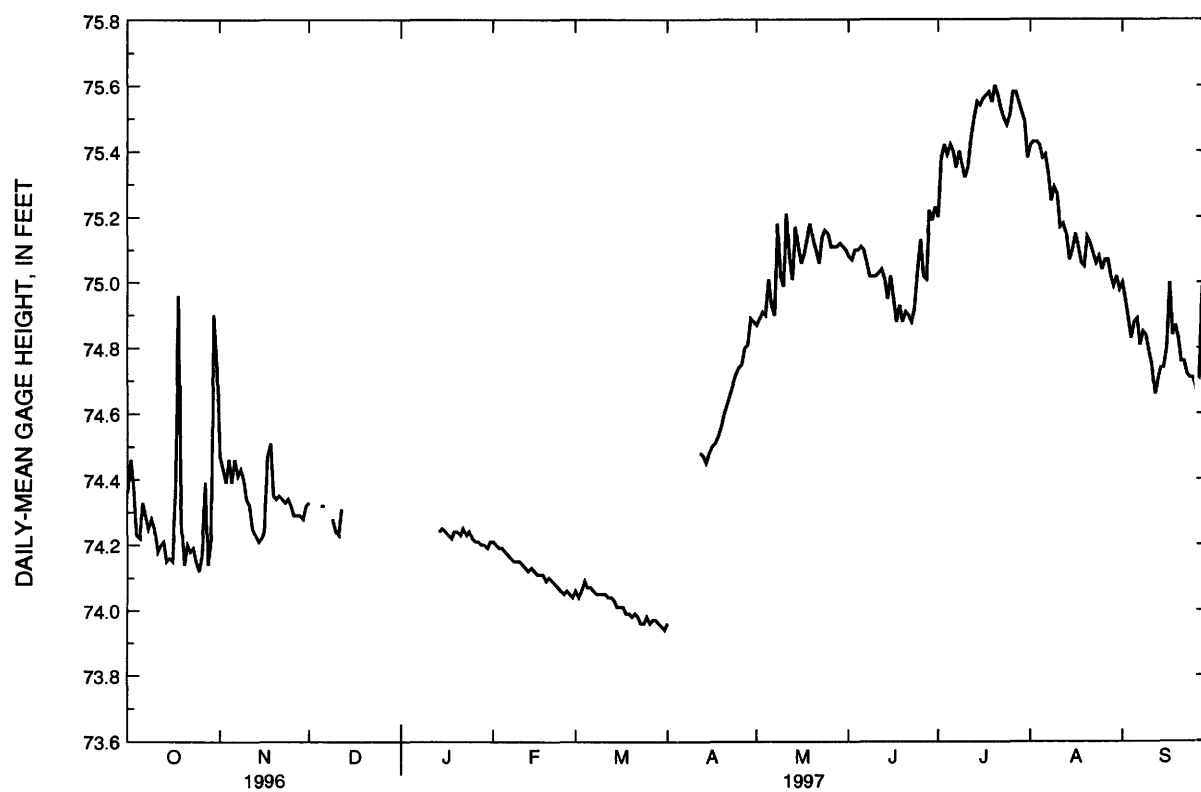
GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	74.36	74.47	74.33	---	74.21	74.06	73.96	74.87	75.08	75.20	75.42	75.00
2	74.46	74.43	---	---	74.20	74.04	---	74.89	75.07	75.38	75.42	74.95
3	74.37	74.39	---	---	74.19	74.06	---	74.91	75.10	75.42	75.42	74.89
4	74.23	74.46	---	---	74.19	74.09	---	74.90	75.10	75.39	75.42	74.83
5	74.22	74.39	74.32	---	74.18	74.07	---	75.01	75.11	75.42	75.38	74.88
6	74.33	74.46	74.32	---	74.17	74.07	---	74.93	75.10	75.40	75.38	74.89
7	74.29	74.41	---	---	74.16	74.06	---	74.90	75.06	75.35	75.32	74.81
8	74.25	74.43	---	---	74.15	74.05	---	75.18	75.02	75.40	75.22	74.85
9	74.28	74.40	74.28	---	74.15	74.05	---	75.02	75.02	75.36	75.22	74.84
10	74.25	74.34	74.24	---	74.15	74.05	---	74.99	75.02	75.32	75.22	74.79
11	74.18	74.32	74.23	---	74.14	74.05	---	75.21	75.03	75.35	75.12	74.75
12	74.20	74.25	74.31	---	74.13	74.04	74.48	75.08	75.04	75.44	75.12	74.66
13	74.21	74.23	---	---	74.12	74.04	74.47	75.01	75.01	75.50	75.12	74.70
14	74.15	74.21	---	74.24	74.13	74.03	74.45	75.17	74.95	75.55	75.02	74.74
15	74.16	74.22	---	74.25	74.12	74.01	74.48	75.11	75.02	75.54	75.10	74.74
16	74.15	74.24	74.27	74.24	74.11	74.01	74.50	75.06	74.95	75.56	75.12	74.80
17	74.36	74.47	---	74.23	74.11	74.01	74.51	75.09	74.88	75.57	75.11	75.00
18	74.96	74.51	---	74.22	74.11	73.99	74.53	75.14	74.93	75.58	75.02	74.84
19	74.27	74.35	---	74.24	74.09	73.99	74.56	75.18	74.88	75.55	75.02	74.87
20	74.14	74.34	---	74.24	74.10	73.98	74.60	75.13	74.91	75.60	75.14	74.83
21	74.20	74.35	---	74.23	74.09	73.99	74.63	75.10	74.90	75.57	75.12	74.76
22	74.18	74.34	---	74.25	74.08	73.98	74.66	75.06	74.88	75.53	75.02	74.76
23	74.19	74.33	---	74.23	74.07	73.96	74.69	75.14	74.92	75.50	75.02	74.72
24	74.15	74.34	---	74.24	74.06	73.96	74.72	75.16	75.04	75.48	75.02	74.71
25	74.12	74.32	---	74.22	74.05	73.98	74.74	75.15	75.13	75.51	75.04	74.71
26	74.17	74.29	---	74.21	74.06	73.96	74.75	75.11	75.02	75.58	75.07	74.67
27	74.39	74.29	---	74.21	74.05	73.97	74.80	75.11	75.01	75.58	75.07	74.69
28	74.14	74.29	---	74.20	74.04	73.97	74.81	75.11	75.22	75.55	75.02	74.98
29	74.22	74.28	---	74.20	---	73.96	74.89	75.12	75.19	75.52	74.92	75.06
30	74.90	74.32	---	74.19	---	73.95	74.88	75.11	75.23	75.49	75.02	74.77
31	74.74	---	---	74.21	---	73.94	---	75.10	---	75.38	74.92	---
MEAN	74.30	74.35	---	---	74.12	74.01	---	75.07	75.03	75.47	75.12	74.82
MAX	74.96	74.51	---	---	74.21	74.39	---	75.21	75.23	75.60	75.42	75.06
MIN	74.12	74.21	---	---	74.04	73.94	---	74.87	74.88	75.20	74.92	74.66

RED RIVER OF THE NORTH BASIN

05073650 LOWER RED LAKE AT BATTLE RIVER MOUTH NEAR SAUM, MN--Continued



050740

LOCATION.--Lat 47°57'27", long 95°16'34", in SW¹/₄NW
Reservation, on left bank just upstream from dam at outlet

DRAINAGE AREA.--1,950 mi², approximately.

PERIOD OF RECORD.--June 1930 to November 1932 and
"Lake" May 1933 to September 1940. Records on Upper
Survey. October 1921 to September 1929 gage heights at
(fragmentary).

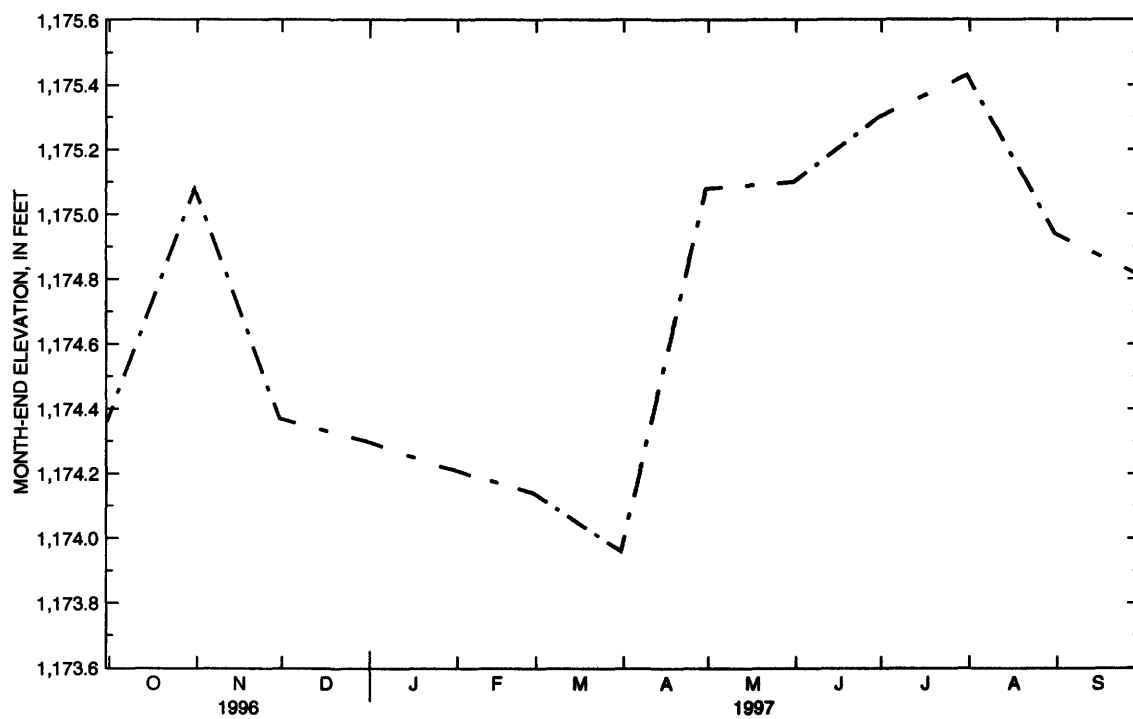
GAGE.--Water-stage recorder. Datum of gage is 1,100.00 ft,
elevations based on adjustment of 1912. May 1933 to Sep
69.00 ft higher. Nonrecording gage at Redby.

REMARKS.--Water level subject to fluctuation caused by ch

EXTREMES FOR PERIOD OF RECORD.--Maximum elev

EXTREMES FOR CURRENT YEAR.--**Maximum daily,

RED RIVER OF THE NORTH BASIN
05074000 LOWER RED LAKE NEAR RED LAKE, MN--Continued



RED RIVER OF THE NORTH BASIN

05075000 RED LAKE RIVER AT HIGH LANDING, NEAR GOODRIDGE, MN

LOCATION.--Lat 48°02'34", long 95°48'28", in NW¼NW¼ sec. 28, T.153 N., R.40 W., Pennington County, Hydrologic Unit 09020303, on left bank 50 ft upstream from highway bridge at High Landing, 7 mi south of Goodridge and 33 mi upstream from Thief River.

DRAINAGE AREA.--2,300 mi², approximately.

PERIOD OF RECORD.--September 1929 to current year. Prior to October 1930, published as "at Kratka".

GAGE.--Water-stage recorder. Datum of gage is 1,141.57 ft above sea level, adjustment of 1912 (levels by U.S. Army Corps of Engineers). See WSP 1308 or 1731 for history of changes prior to Oct. 1, 1949.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Flow regulated by outlet dam on Lower Red Lake.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	930	1520	e1100	e1140	e1050	e940	e1300	655	1440	943	1320	1140
2	919	1620	e1100	e1150	e1050	e940	1380	603	1460	1000	1310	1130
3	905	1450	e1090	e1150	e1050	e950	1380	557	1560	1400	1310	1120
4	899	1360	e1120	e1150	e1050	e950	1590	518	1490	1710	1310	1120
5	896	1380	e1130	e1150	e1020	e950	1990	484	1220	1440	1310	1110
6	889	1430	e1130	e1140	e1000	e950	e1900	477	1040	1070	1310	1090
7	878	1450	e1130	e1140	e1000	e950	e1500	456	968	849	1310	1090
8	876	1430	e1130	e1140	e970	e950	e1450	512	936	760	1300	1120
9	901	1410	e1130	e1140	e950	e950	e1800	572	910	772	1290	1110
10	963	1510	e1130	e1140	e930	e960	e2200	541	894	988	1220	1090
11	1020	1390	e1140	e1140	e910	e970	e2000	504	993	1180	1130	1090
12	1050	1070	e1140	e1140	e910	e980	1670	514	1200	1320	1030	1100
13	1090	e800	e1140	e1140	e910	e1000	1570	489	1300	1440	1010	1100
14	1150	e500	e1140	e1120	e900	e1020	1810	478	1350	1610	1050	1100
15	1210	e490	e1170	e1100	e900	e1020	2200	480	1380	1720	1090	1120
16	1230	e520	e1160	e1100	e900	e1050	2050	682	1380	1590	1150	1150
17	1240	e500	e1160	e1050	e900	e1080	1960	904	1390	1290	1180	1160
18	1290	e480	e1160	e1050	e900	e1100	1980	935	1410	1020	1190	1150
19	1300	e470	e1160	e1050	e900	e1120	1960	926	1420	836	1210	1150
20	1300	e460	e1160	e1050	e900	e1140	1660	919	1430	714	1230	1140
21	1320	e600	e1150	e1050	e910	e1140	1470	915	1420	627	1230	1140
22	1330	e780	e1150	e1020	e910	e1140	1350	1050	1400	603	1220	1140
23	1320	e770	e1150	e1020	e920	e1140	1260	1300	1410	761	1220	1130
24	1320	e760	e1150	e1000	e920	e1150	1160	1430	1490	955	1210	1130
25	1340	e750	e1150	e1000	e920	e1160	1050	1470	1540	1080	1210	1120
26	1350	e750	e1140	e980	e930	e1180	945	1490	1340	1160	1190	1120
27	1390	e750	e1140	e960	e930	e1200	862	1480	1120	1220	1180	1130
28	1400	e950	e1140	e960	e930	e1190	800	1470	1030	1260	1170	1150
29	1380	e1100	e1140	e970	---	e1180	745	1460	1020	1290	1170	1160
30	1420	e1120	e1140	e1000	---	e1200	712	1450	978	1310	1160	1140
31	1400	---	e1140	e1050	---	e1250	---	1440	---	1320	1150	---
TOTAL	35906	29570	35310	33390	26470	32900	45704	27161	37919	35238	37370	33740
MEAN	1158	986	1139	1077	945	1061	1523	876	1264	1137	1205	1125
MAX	1420	1620	1170	1150	1050	1250	2200	1490	1560	1720	1320	1160
MIN	876	460	1090	960	900	940	712	456	894	603	1010	1090
AC-FT	71220	58650	70040	66230	52500	65260	90650	53870	75210	69890	74120	66920
CFSM	.50	.43	.50	.47	.41	.46	.66	.38	.55	.49	.52	.49
IN.	.58	.48	.57	.54	.43	.53	.74	.44	.61	.57	.60	.55

e Estimated

RED RIVER OF THE NORTH BASIN

05075000 RED LAKE RIVER AT HIGH LANDING, NEAR GOODRIDGE, MN

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	537	508	469	466	463	504	682	676	673	588	516	531
MAX	1955	1730	1539	1424	1366	1453	1980	3179	2161	2474	1478	1733
(WY)	1951	1951	1951	1951	1951	1951	1951	1950	1950	1975	1975	1950
MIN	2.11	1.61	.000	.000	.000	.000	24.7	5.58	1.04	5.92	.026	.000
(WY)	1934	1934	1934	1934	1934	1936	1933	1933	1936	1934	1934	1934

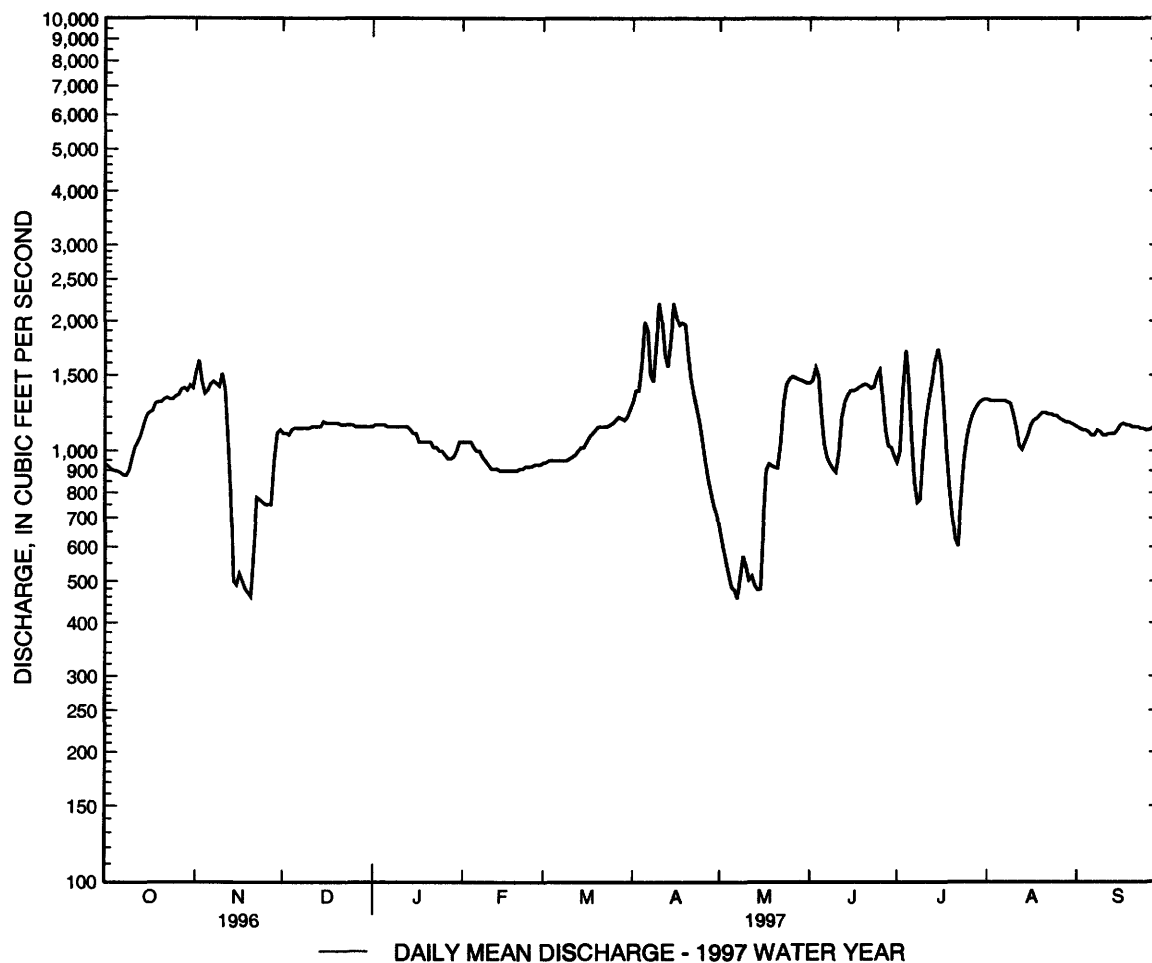
SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1930 - 1997
ANNUAL TOTAL	407829	410678	
ANNUAL MEAN	1114	1125	551
HIGHEST ANNUAL MEAN			1407
LOWEST ANNUAL MEAN			6.21
HIGHEST DAILY MEAN	3020	2200	4040
LOWEST DAILY MEAN	460	456	.00 ^b
ANNUAL SEVEN-DAY MINIMUM	489	489	.00
INSTANTANEOUS PEAK FLOW		2260 ^c	4060 ^d
INSTANTANEOUS PEAK STAGE		12.36 ^a	13.44
ANNUAL RUNOFF (AC-FT)	808900	814600	399300
ANNUAL RUNOFF (CFSM)	.48	.49	.24
ANNUAL RUNOFF (INCHES)	6.60	6.64	3.26
10 PERCENT EXCEEDS	1410	1450	1180
50 PERCENT EXCEEDS	1050	1130	460
90 PERCENT EXCEEDS	860	771	35

a Backwater from ice.

b Many days, several years.

c Maximum recorded, may have been higher on Apr. 10.

d Gage-height 13.39 ft.



RED RIVER OF THE NORTH BASIN

05076000 THIEF RIVER NEAR THIEF RIVER FALLS, MN

LOCATION.--Lat 48°11'08", long 96°10'11", in NW¼SW¼ sec. 3, T.154 N., R.43 W., Marshall County, Hydrologic Unit 09020304, on right bank, 0.2 mi upstream from highway bridge, 5 mi north of Thief River Falls, 7 mi upstream from mouth, and 9 mi downstream from Mud Lake National Wildlife Refuge.

DRAINAGE AREA.--959 mi².

PERIOD OF RECORD.--July 1909 to September 1917, April 1920 to September 1921, October 1922 to September 1924, October 1928 to September 1981, March 1982 to current year. Monthly discharge only for some periods, annual maximums for water years 1919, 1922, 1925, 1926, published in WSP 1308. October 1981 to February 1982, operated as a high-flow partial-record station.

REVISED RECORDS.--WSP 925: Drainage area. WSP 1308: 1917(M), 1924(M), 1929(M), 1931-33(M), 1935(M), 1937(M).

GAGE.--Water-stage recorder and control of grouted boulders. Datum of gage is 1,112.33 ft above mean sea level (levels by Minnesota Department of Transportation). Prior to May 4, 1939, nonrecording gages at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Some regulation by Thief and Mud Lakes.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	27	214	e60	e25	e4.2	e2.4	e200	2640	1460	450	270	8.0
2	27	203	e56	e23	e3.9	e2.4	e450	2580	1430	1150	269	5.0
3	24	216	e53	e22	e3.5	e2.4	e660	2490	1460	2050	266	3.6
4	20	232	e50	e21	e3.0	e2.5	e900	2420	1430	2320	264	2.6
5	18	211	e49	e20	e2.7	e2.5	e900	2340	1420	2220	259	2.1
6	18	243	e47	e19	e2.6	e2.4	e890	2270	1310	2010	151	1.7
7	18	273	e46	e18	e2.5	e2.3	e880	2220	859	1750	125	1.7
8	17	302	e45	e17	e2.4	e3.8	e870	2270	747	1530	122	2.8
9	17	291	e45	e16	e2.3	e4.5	e860	2330	714	1380	120	5.0
10	13	e250	e44	e14	e2.2	e6.4	e850	2260	694	1240	120	3.3
11	14	e200	e44	e13	e2.0	e6.0	e900	2180	678	1160	119	2.4
12	11	e170	e44	e12	e1.9	e5.8	e950	2170	662	886	117	1.8
13	10	e140	e45	e10	e1.8	e5.5	e1000	2140	650	840	114	1.7
14	9.6	e130	e45	e9.0	e1.8	e5.0	e1080	2090	637	890	114	1.6
15	13	e120	e46	e8.2	e1.8	e5.0	e1190	2060	629	973	116	1.7
16	15	e110	e46	e8.0	e1.7	e10	e1040	2010	626	908	116	2.6
17	23	e105	e46	e8.0	e1.7	e35	e1200	1950	622	804	114	6.4
18	31	e100	e47	e8.5	e1.7	e50	e1600	1890	623	736	112	7.3
19	33	e97	e47	e9.0	e1.7	e87	e2500	1830	620	694	111	4.8
20	49	e95	e46	e9.2	e1.7	e84	3440	1750	621	664	111	14
21	51	e92	e44	e9.3	e1.8	e80	3750	1670	615	636	107	22
22	43	e89	e43	e9.0	e1.9	e78	4080	1670	607	591	39	21
23	168	e86	e41	e9.0	e1.9	e74	4080	1680	603	354	29	24
24	198	e82	e38	e8.8	e1.9	e72	4000	1680	565	310	27	24
25	197	e76	e37	e8.3	e2.0	e70	3870	1640	580	300	26	25
26	202	e72	e36	e7.4	e2.1	e68	3690	1590	558	299	24	40
27	203	e70	e36	e7.0	e2.2	e68	3370	1560	508	298	20	15
28	196	e70	e34	e6.2	e2.3	e70	3040	1480	411	289	16	6.5
29	150	e66	e31	e5.6	---	e76	2810	1470	429	282	16	4.7
30	137	e62	e30	e5.0	---	e86	2670	1500	461	277	15	5.1
31	154	---	e28	e4.7	---	e130	---	1520	---	272	13	---
TOTAL	2106.6	4467	1349	370.2	63.2	1196.9	57720	61350	23229	28563	3442	267.4
MEAN	68.0	149	43.5	11.9	2.26	38.6	1924	1979	774	921	111	8.91
MAX	203	302	60	25	4.2	130	4080	2640	1460	2320	270	40
MIN	9.6	62	28	4.7	1.7	2.3	200	1470	411	272	13	1.6
AC-FT	4180	8860	2680	734	125	2370	114500	121700	46070	56650	6830	530
CFSM	.07	.16	.05	.01	.00	.04	2.01	2.06	.81	.96	.12	.01
IN.	.08	.17	.05	.01	.00	.05	2.24	2.38	.90	1.11	.13	.01

e Estimated

RED RIVER OF THE NORTH BASIN

05076000 THIEF RIVER NEAR THIEF RIVER FALLS, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1997, BY WATER YEAR (WY)

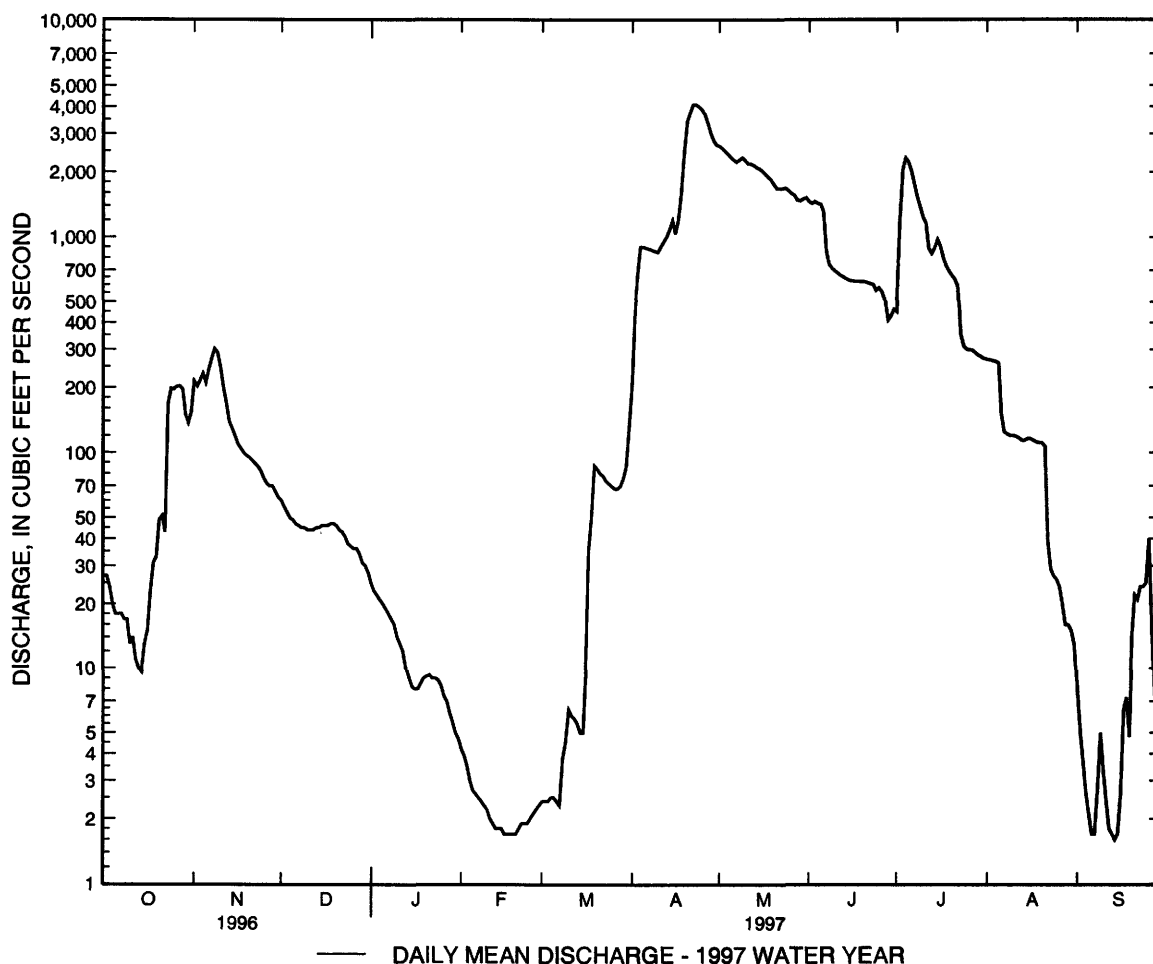
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	87.4	67.5	20.3	5.68	3.41	75.8	597	492	297	222	98.0	97.2
MAX	637	844	206	100	45.0	773	2827	4274	1774	2103	1012	1012
(WY)	1986	1972	1945	1910	1910	1995	1966	1950	1962	1975	1993	1993
MIN	.000	.000	.000	.000	.000	.000	7.75	1.83	.032	.000	.000	.000
(WY)	1911	1911	1911	1911	1911	1930	1981	1990	1980	1932	1932	1929

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1909 - 1997
ANNUAL TOTAL	176288.4	184124.3	
ANNUAL MEAN	482	504	171a
HIGHEST ANNUAL MEAN			607
LOWEST ANNUAL MEAN			1.28
HIGHEST DAILY MEAN	3280	Apr 26	4080
LOWEST DAILY MEAN	1.5	Feb 12 to Mar 8	1.6
ANNUAL SEVEN-DAY MINIMUM	1.5	Feb 12	1.7
INSTANTANEOUS PEAK FLOW		4120	5610
INSTANTANEOUS PEAK STAGE		16.33	17.38
ANNUAL RUNOFF (AC-FT)	349700	365200	124100
ANNUAL RUNOFF (CFSM)	.50	.53	.18
ANNUAL RUNOFF (INCHES)	6.84	7.14	2.43
10 PERCENT EXCEEDS	1680	1750	543
50 PERCENT EXCEEDS	90	76	8.3
90 PERCENT EXCEEDS	1.7	2.5	.00

a Median of annual mean discharges is 122 ft³/s.

b Gage height, 15.20 ft.

c Backwater from ice.



RED RIVER OF THE NORTH BASIN

05078000 CLEARWATER RIVER AT PLUMMER, MN

LOCATION.--Lat 47°55'24", long 96°02'46", in SE 1/4 SW 1/4 sec. 4, T.151 N., R.42 W., Red Lake County, Hydrologic Unit 09020305, on right bank 200 ft downstream from Soo Line Railroad bridge, 300 ft downstream from bridge on U.S. Highway 59, 0.9 mi northwest of railroad depot in Plummer, and 8 mi upstream from Hill River.

DRAINAGE AREA.--512 mi².

PERIOD OF RECORD.--April 1939 to September 1979, March 1982 to current year. Annual maximums only, October 1979 to February 1982.

GAGE.--Water-stage recorder. Datum of gage is 1,098.57 ft above sea level (levels by U.S. Army Corps of Engineers). Prior to Nov. 10, 1939, nonrecording gage at site 100 ft upstream at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Since 1968, undetermined amounts of water diverted for the flooding of wild rice paddies upstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 16	2000	*a2700	*12.74	July 06	0430	1760	8.91
June 27	2300	1100	7.32	July 14	1800	1740	8.87

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	56	168	e80	e70	e78	e76	e190	406	252	888	313	90
2	47	178	e84	e72	e80	e74	e290	357	241	963	290	85
3	50	189	e86	e74	e80	e72	e430	306	346	1120	249	83
4	52	163	e84	e74	e78	e72	e660	290	300	1490	222	81
5	44	145	e82	e74	e76	e72	e960	259	227	1710	208	75
6	47	144	e80	e72	e74	e72	e1500	222	191	1740	210	74
7	52	148	e80	e72	e72	e70	e2200	196	173	1740	202	76
8	52	174	e78	e72	e70	e70	e2100	217	177	1740	188	82
9	55	185	e78	e72	e70	e72	e2000	266	172	1740	167	79
10	47	148	e76	e72	e68	e72	e2000	260	146	1670	150	80
11	46	e130	e74	e70	e68	e74	e2000	291	126	1510	140	76
12	52	e110	e74	e70	e66	e76	e2100	295	115	1310	133	74
13	45	e100	e76	e70	e66	e76	e2200	251	95	1190	126	64
14	47	e96	e78	e70	e66	e74	e2400	231	106	1530	116	61
15	44	e90	e76	e70	e66	e74	e2600	222	103	1470	115	68
16	44	e86	e76	e70	e66	e74	e2700	214	108	1250	122	78
17	52	e96	e76	e70	e66	e74	e2600	225	109	1190	127	90
18	54	e96	e78	e72	e68	e78	e2500	245	109	1130	122	109
19	71	e90	e78	e74	e70	e82	2360	231	120	1060	121	91
20	71	e86	e78	e78	e74	e84	2000	200	139	950	136	73
21	67	e84	e76	e78	e74	e86	1630	192	187	812	166	55
22	59	e82	e76	e78	e72	e86	1330	210	168	710	148	54
23	45	e80	e76	e76	e72	e86	1100	242	155	668	133	62
24	47	e78	e74	e74	e70	e84	939	356	504	620	121	66
25	49	e76	e74	e72	e72	e84	791	418	806	553	122	55
26	52	e76	e72	e70	e74	e82	651	408	901	518	118	62
27	68	e74	e72	e70	e76	e82	563	392	1050	462	109	63
28	77	e74	e72	e70	e78	e84	494	361	1040	391	106	69
29	71	e72	e72	e70	---	e90	445	336	822	368	103	84
30	88	e74	e70	e72	---	e100	426	318	831	366	100	92
31	94	---	e70	e76	---	e130	---	293	---	362	94	---
TOTAL	1745	3392	2376	2244	2010	2482	44159	8710	9819	33221	4777	2251
MEAN	56.3	113	76.6	72.4	71.8	80.1	1472	281	327	1072	154	75.0
MAX	94	189	86	78	80	130	2700	418	1050	1740	313	109
MIN	44	72	70	70	66	70	190	192	95	362	94	54
AC-FT	3460	6730	4710	4450	3990	4920	87590	17280	19480	65890	9480	4460
CFSM	.11	.22	.15	.14	.14	.16	2.87	.55	.64	2.09	.30	.15

a Estimated daily discharge, backwater from ice.

e Estimated

RED RIVER OF THE NORTH BASIN

05078000 CLEARWATER RIVER AT PLUMMER, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	116	92.0	64.0	51.8	48.3	114	542	355	252	223	124	106
MAX	483	503	140	90.1	98.4	445	1472	1974	1140	1072	507	666
(WY)	1972	1972	1978	1952	1974	1995	1997	1950	1962	1997	1985	1973
MIN	21.5	23.8	24.4	18.4	19.0	22.8	26.8	7.52	30.1	16.0	13.3	14.1
(WY)	1941	1991	1990	1940	1940	1940	1977	1977	1991	1940	1940	1940

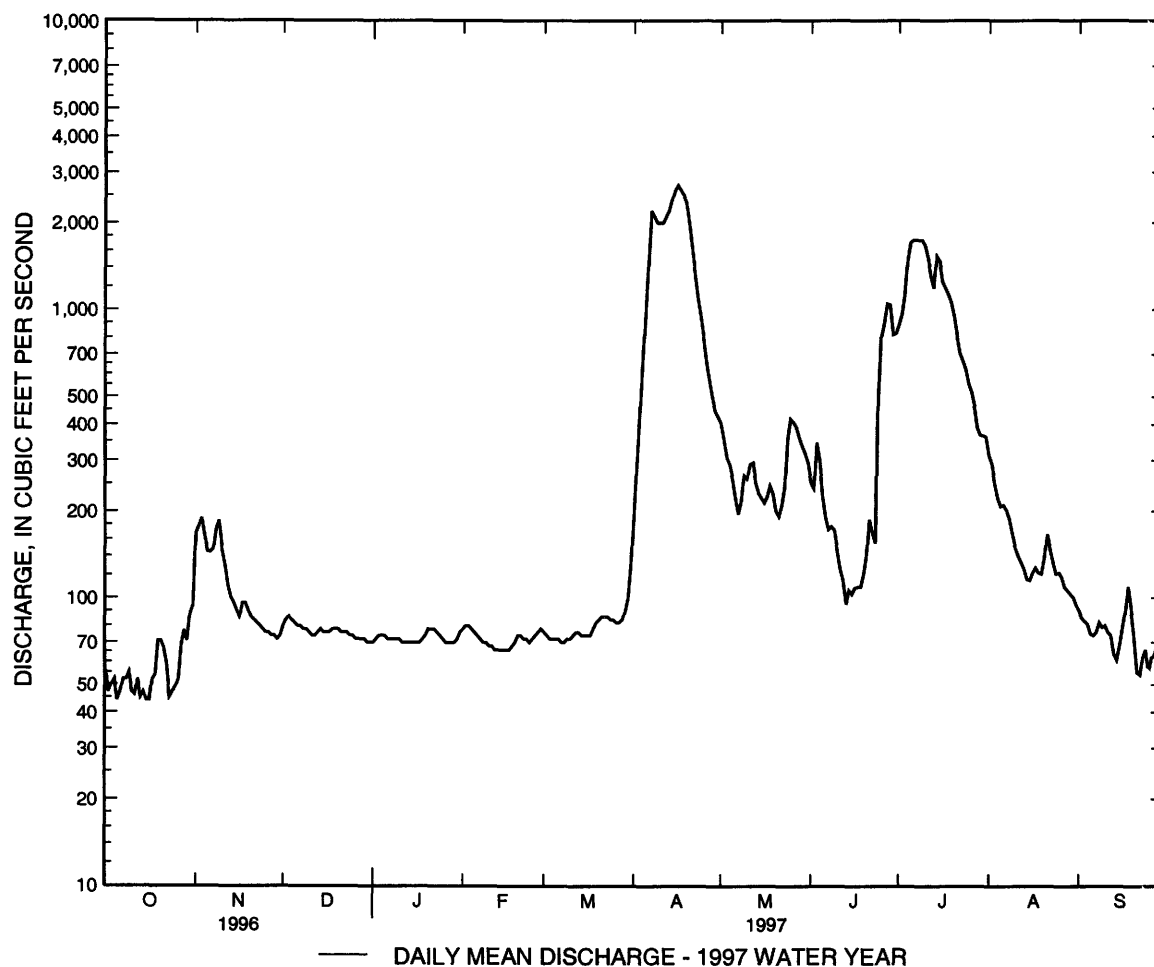
SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1939 - 1997
ANNUAL TOTAL	101574	117186	
ANNUAL MEAN	278	321	175 ^a
HIGHEST ANNUAL MEAN			354
LOWEST ANNUAL MEAN			57.0
HIGHEST DAILY MEAN	3320	2700 ^b	3840
LOWEST DAILY MEAN	37	44	2.6
ANNUAL SEVEN-DAY MINIMUM	39	46	2.9
INSTANTANEOUS PEAK FLOW		2700 ^c	3940
INSTANTANEOUS PEAK STAGE		12.74 ^d	12.74 ^d
INSTANTANEOUS LOW FLOW		40	2.5
ANNUAL RUNOFF (CFSM)	.54	.63	.34
10 PERCENT EXCEEDS	495	1040	410
50 PERCENT EXCEEDS	86	86	76
90 PERCENT EXCEEDS	52	66	33

a Median of annual mean discharges is 166 ft³/s.

b Estimated, backwater from ice.

c Estimated daily discharge, backwater from ice.

d Backwater from ice.



RED RIVER OF THE NORTH BASIN
05078230 LOST RIVER AT OKLEE, MN

LOCATION.--Lat 47°50'35", long 95°51'30", in SE 1/4 NE 1/4 sec. 2, T.150 N., R.41 W., Red Lake County, Hydrologic Unit 09020305, on downstream side of bridge on State Highway 222 at northwest edge of Oklee, 12 mi upstream from mouth.

DRAINAGE AREA.--266 mi².

PERIOD OF RECORD.--April 1960 to September 1981, February 1982 to current year. Monthly and daily figures for April 1960 to June 1960 published in WSP 2113.

GAGE.--Water-stage recorder. Datum of gage is 1,126.94 ft above sea level, adjustment of 1912 (levels by U.S. Army Corps of Engineers). Prior to Sept. 9, 1960, reference points at same site at datum 8.00 ft higher. Sept. 9, 1960 to Sept. 30, 1964, nonrecording gage at same site at datum 8.00 ft higher. Oct. 1, 1964 to Sept. 30, 1981, and Feb. 24, 1982 to Sept. 6, 1989, nonrecording gage at same site and datum.

REMARKS.--Records fair except those for estimated daily discharges, which are poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known since at least 1897, 18.39 ft, present datum, Apr. 21, 1950, from floodmarks, discharge, 2,790 ft³/s.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	45	e27	e26	e30	e18	e30	149	73	498	77	1.1
2	21	43	e29	e27	e30	e18	e90	137	64	430	58	1.2
3	21	47	e31	e27	e29	e18	e300	124	66	610	51	.23
4	23	40	e33	e26	e28	e17	e380	111	58	1080	49	.18
5	24	38	e34	e26	e27	e17	e370	108	48	1020	50	.18
6	29	38	e35	e26	e25	e17	e350	104	45	795	52	.81
7	27	41	e35	e26	e24	e17	e340	97	44	520	48	1.7
8	29	40	e34	e26	e23	e18	e340	118	39	377	41	6.3
9	30	34	e34	e26	e22	e18	e340	121	34	310	34	8.8
10	30	31	e33	e26	e21	e18	e360	115	27	264	28	8.4
11	31	e31	e32	e26	e20	e19	e500	119	21	231	22	9.1
12	32	e29	e32	e26	e19	e19	e1000	116	16	212	17	9.2
13	31	e27	e31	e26	e19	e19	e1400	101	11	218	14	9.7
14	32	e25	e31	e25	e18	e20	e1700	107	8.4	231	12	12
15	36	e24	e31	e25	e18	e20	1900	112	8.9	252	11	14
16	37	e24	e30	e25	e18	e20	1350	107	9.4	231	12	18
17	36	e24	e30	e25	e18	e20	1060	100	9.5	206	12	21
18	41	e24	e30	e26	e18	e20	1150	98	17	181	10	37
19	40	e23	e30	e28	e18	e20	982	102	20	162	11	60
20	38	e24	e30	e29	e18	e20	704	96	24	149	17	61
21	37	e23	e30	e29	e18	e20	546	90	42	136	22	57
22	37	e23	e29	e28	e18	e20	434	89	47	129	23	54
23	37	e23	e29	e28	e19	e20	352	160	47	119	21	52
24	35	e22	e29	e27	e19	e20	292	222	407	112	18	50
25	34	e22	e28	e26	e19	e20	256	202	1050	106	14	50
26	33	e22	e28	e25	e19	e20	221	173	1150	101	11	49
27	33	e22	e27	e25	e19	e21	202	146	1210	98	9.3	47
28	34	e23	e27	e24	e18	e22	189	123	845	93	7.3	49
29	35	e24	e27	e24	---	e22	185	104	672	93	5.7	53
30	42	e24	e27	e25	---	e23	167	87	588	87	3.9	52
31	44	---	e26	e27	---	e25	---	91	---	83	2.1	---
TOTAL	1009	880	939	811	592	606	17490	3729	6701.2	9134	763.3	792.90
MEAN	32.5	29.3	30.3	26.2	21.1	19.5	583	120	223	295	24.6	26.4
MAX	44	47	35	29	30	25	1900	222	1210	1080	77	61
MIN	20	22	26	24	18	17	30	87	8.4	83	2.1	.18
AC-FT	2000	1750	1860	1610	1170	1200	34690	7400	13290	18120	1510	1570
CFSM	.12	.11	.11	.10	.08	.07	2.19	.45	.84	1.11	.06	.10
IN.	.14	.12	.13	.11	.08	.08	2.45	.52	.94	1.28	.11	.11

e Estimated

RED RIVER OF THE NORTH BASIN
05078230 LOST RIVER AT OKLEE, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	48.4	31.2	14.3	8.95	8.40	72.9	312	134	89.1	85.3	40.0	38.0
MAX	470	232	56.6	26.2	25.8	243	904	622	657	442	351	330
(WY)	1972	1972	1978	1997	1984	1995	1996	1962	1962	1962	1985	1973
MIN	1.02	1.11	.050	.002	.000	.19	29.5	10.5	8.20	1.99	1.17	.000
(WY)	1991	1977	1977	1977	1977	1964	1991	1980	1980	1961	1961	1990

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1960 - 1997	
ANNUAL TOTAL	48262.0		43447.40		73.5	
ANNUAL MEAN	132		119		177	
HIGHEST ANNUAL MEAN					18.2	
LOWEST ANNUAL MEAN					3040	
HIGHEST DAILY MEAN	2750		1900		Apr 11	
LOWEST DAILY MEAN	9.2		.18		Sep 16	
ANNUAL SEVEN-DAY MINIMUM	9.8		.77		Feb 16	
INSTANTANEOUS PEAK FLOW			2030		Apr 11	
INSTANTANEOUS PEAK STAGE			16.91		Apr 8	
ANNUAL RUNOFF (AC-FT)	95730		86180		53230	
ANNUAL RUNOFF (CFSM)	.50		.45		.28	
ANNUAL RUNOFF (INCHES)	6.75		6.08		3.75	
10 PERCENT EXCEEDS	195		304		174	
50 PERCENT EXCEEDS	25		30		19	
90 PERCENT EXCEEDS	17		17		2.5	

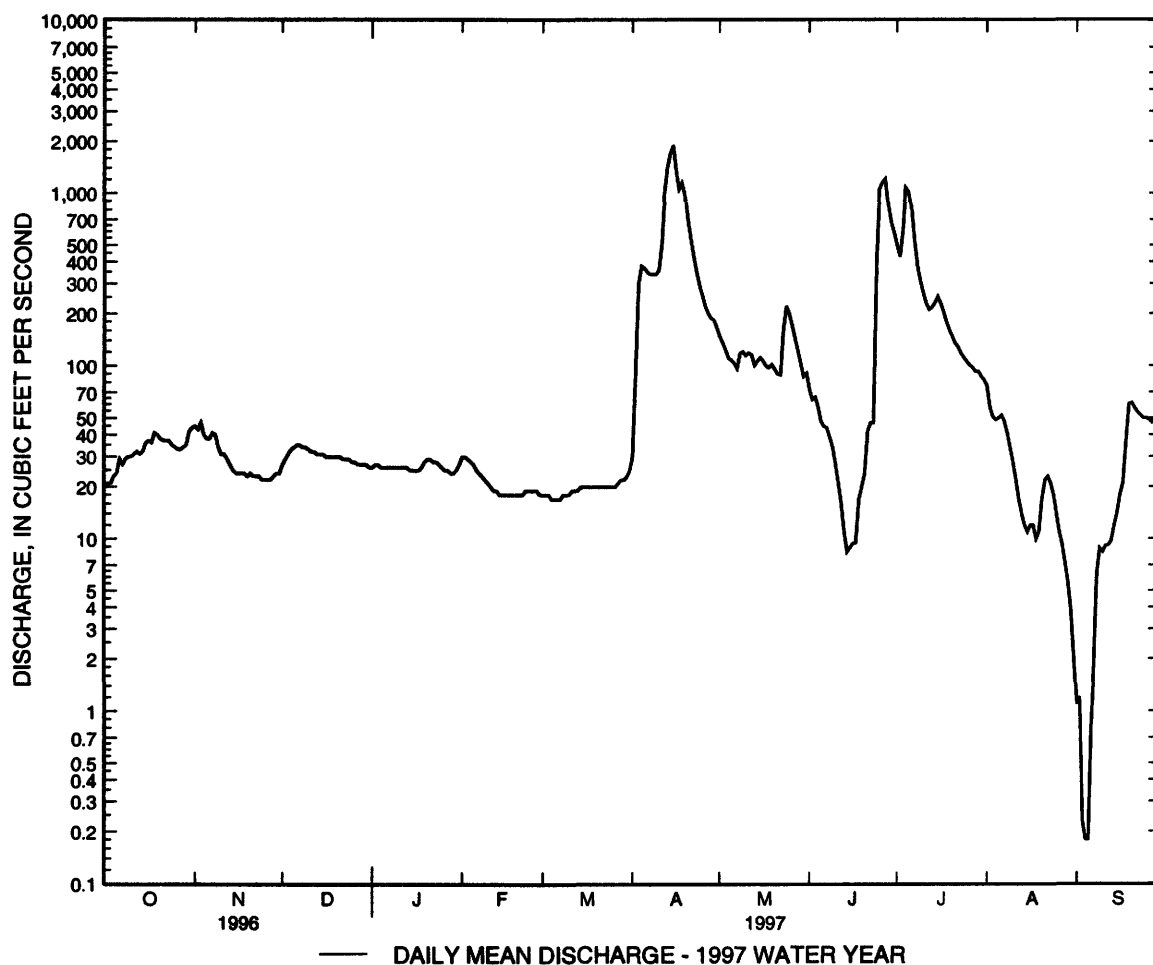
a Drop in discharge from undetermined cause.

b Many days, several years.

c Gage height, 14.54 ft.

d Gage height, 14.91 ft; from floodmark.

e Backwater from ice.



RED RIVER OF THE NORTH BASIN

05078500 CLEARWATER RIVER AT RED LAKE FALLS, MN

LOCATION.--Lat 47°53'15", long 96°16'25", in NW¼/NE¼ sec. 22, T.151 N., R.44 W., Red Lake County, Hydrologic Unit 09020305, on left bank 40 ft downstream from Great Northern Railroad bridge in Red Lake Falls, 1.4 mi upstream from mouth, and 3 mi downstream from Badger Creek.

DRAINAGE AREA.--1,370 mi² (approximately).

PERIOD OF RECORD.--June 1909 to September 1917, October 1934 to September 1981, March 1982 to current year. Monthly discharge only for October, November, 1934, published in WSP 1308. October 1981 to February 1982, operated as a high-flow partial-record station.

REVISED RECORDS.--WSP 355: 1911-12. WSP 1438: 1910-11, 1917(M). WDR MN-84-1:1983.

GAGE.--Water-stage recorder. Datum of gage is 948.94 ft above sea level (levels by U.S. Army Corps of Engineers). Prior to Sept. 12, 1911, nonrecording gage at site 0.5 mi upstream, and Sept. 12, 1911 to Sept. 30, 1917, nonrecording gage at site 40 ft upstream at different datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	115	168	e130	e115	e130	e130	e200	1040	594	2900	587	149
2	107	268	e130	e120	e135	e125	e250	948	581	5610	525	142
3	92	296	e130	e123	e135	e125	e370	861	749	4760	494	129
4	93	303	e135	e125	e133	e125	e800	779	706	5210	426	126
5	91	273	e140	e125	e130	e123	e2000	735	559	4740	400	124
6	81	272	e135	e125	e128	e120	e4200	663	460	4350	400	114
7	81	263	e133	e123	e125	e120	e4500	625	402	3980	394	107
8	90	281	e130	e122	e123	e120	4300	625	365	3600	357	116
9	84	290	e127	e120	e120	e123	4350	682	347	3290	339	119
10	86	257	e125	e120	e120	e125	4220	676	301	2990	303	114
11	78	167	e125	e115	e118	e125	3990	671	264	2660	279	116
12	75	156	e130	e115	e118	e124	4190	667	233	2350	259	114
13	88	e145	e132	e115	e115	e123	4990	629	208	2170	242	109
14	81	e135	e132	e115	e113	e122	6080	576	188	2460	225	98
15	77	e128	e130	e115	e110	e120	7460	572	191	2880	210	98
16	70	e120	e130	e115	e110	e125	e7200	555	179	2500	216	121
17	73	e130	e128	e120	e113	e130	6810	546	179	2150	215	129
18	98	e130	e128	e123	e117	e135	6700	563	201	1930	215	144
19	97	e130	e126	e125	e123	e145	7260	555	188	1740	210	163
20	128	e140	e124	e130	e130	e150	4930	521	198	1600	215	166
21	135	e135	e122	e132	e130	e150	3910	484	230	1420	241	144
22	129	e130	e120	e132	e125	e145	3130	505	298	1240	262	119
23	126	e130	e120	e127	e125	e145	2550	642	287	1130	244	119
24	103	e128	e120	e124	e125	e143	2190	921	1430	1050	233	126
25	103	e128	e120	e120	e130	e143	1910	989	4380	957	215	119
26	108	e125	e120	e120	e135	e140	1670	921	4320	879	213	98
27	111	e125	e120	e120	e140	e140	1460	866	3810	826	195	100
28	123	e125	e118	e120	e135	e145	1310	816	3800	739	183	112
29	142	e128	e118	e120	---	e150	1190	753	3270	683	179	119
30	157	e132	e115	e125	---	e155	1100	688	2820	649	171	144
31	118	---	e115	e125	---	e165	---	647	---	624	166	---
TOTAL	3140	5338	3908	3771	3491	4156	105220	21721	31738	74067	8813	3698
MEAN	101	178	126	122	125	134	3507	701	1058	2389	284	123
MAX	157	303	140	132	140	165	7460	1040	4380	5610	587	166
MIN	70	120	115	115	110	120	200	484	179	624	166	98
AC-FT	6230	10590	7750	7480	6920	8240	208700	43080	62950	146900	17480	7330
CFSM	.07	.13	.09	.09	.09	.10	2.56	.51	.77	1.74	.21	.09
IN.	.09	.14	.11	.10	.09	.11	2.86	.59	.86	2.01	.24	.10

e Estimated

RED RIVER OF THE NORTH BASIN

05078500 CLEARWATER RIVER AT RED LAKE FALLS, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	188	139	88.6	71.2	65.8	236	1181	684	484	399	206	179
MAX	1350	1233	260	220	150	1136	3507	5059	3042	2389	1686	1267
(WY)	1972	1972	1910	1910	1984	1995	1997	1950	1962	1997	1985	1973
MIN	10.0	19.0	21.4	21.4	19.1	13.6	61.0	32.2	26.5	8.34	1.49	2.92
(WY)	1935	1935	1937	1940	1937	1937	1981	1977	1980	1936	1936	1936

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1909 - 1997
ANNUAL TOTAL	216182	269061	
ANNUAL MEAN	591	737	324 ^a
HIGHEST ANNUAL MEAN			855
LOWEST ANNUAL MEAN			64.4
HIGHEST DAILY MEAN	8710	7460	9930
LOWEST DAILY MEAN	49	70	.10
ANNUAL SEVEN-DAY MINIMUM	52	77	.24
INSTANTANEOUS PEAK FLOW		7860 ^b	10300 ^c
INSTANTANEOUS PEAK STAGE		11.15 ^d	15.85 ^e
INSTANTANEOUS LOW FLOW			.00
ANNUAL RUNOFF (AC-FT)	428800	533700	234600
ANNUAL RUNOFF (INCHES)	5.87	7.31	3.21
10 PERCENT EXCEEDS	1170	2520	795
50 PERCENT EXCEEDS	150	143	110
90 PERCENT EXCEEDS	92	115	38

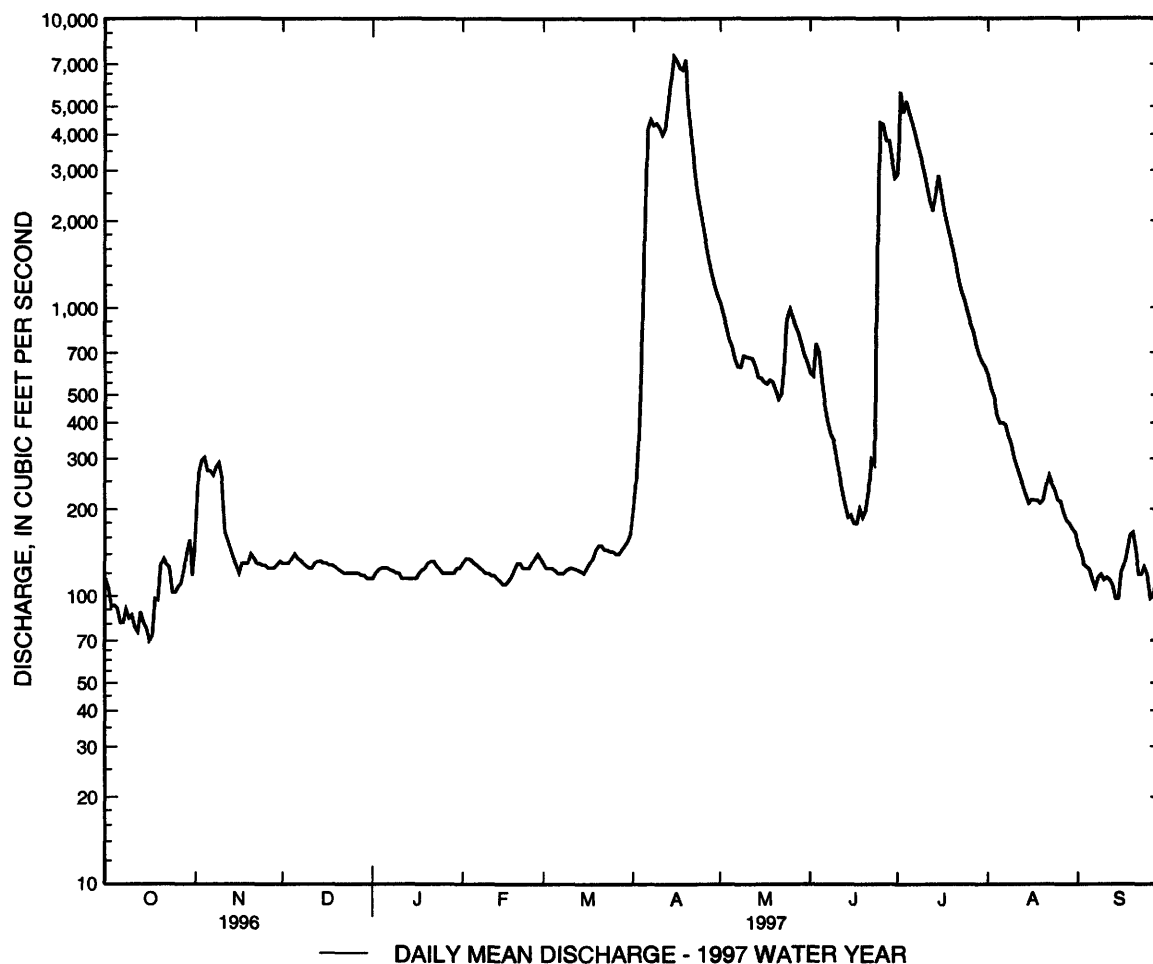
a Median of annual mean discharges is 283 ft³/s.

b Gage height, 11.10 ft.

c Gage height, 12.38 ft.

d Backwater from ice.

e From highwater mark, backwater from ice.



RED RIVER OF THE NORTH BASIN

05079000 RED LAKE RIVER AT CROOKSTON, MN

LOCATION.--Lat 47°46'32", long 96°36'33", in SW1/4SW1/4, sec. 30, T.150 N., R.46 W., Polk County, Hydrologic Unit 09020303, on right bank 100 ft upstream from Sargent Street bridge in Crookston, 0.3 mi downstream from Interstate Power Co.'s dam, 0.6 mi downstream from bridge on U.S. Highway 75, and 53 mi upstream from mouth.

DRAINAGE AREA.--5,270 mi².

PERIOD OF RECORD.--May 1901 to current year. Monthly discharge only for some periods, published in WSP 1308. Figures of daily discharge for Apr. 3-30, 1904, published in WSP 130, have been found unreliable and should not be used.

REVISED RECORDS.--WSP 1115: 1906, 1915-16, 1919-20, 1922, 1925, 1927, 1929. WSP 1308: 1916(M), 1919(M), 1928(M), 1930(M).

(See also PERIOD OF RECORD).

GAGE.--Water-stage recorder. Datum of gage is 832.72 ft above sea level. May 18, 1901 to June 30, 1909, nonrecording gage at bridge 300 ft upstream at same datum. July 1, 1909 to Sept. 25, 1911, nonrecording gage, Sept. 26, 1911 to Sept. 30, 1919, water-stage recorder, Oct. 1, 1919 to Sept. 30, 1930, nonrecording gage, at present site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Diurnal fluctuation prior to 1975 caused by power plant 1,000 ft upstream. Runoff from 1,950 mi² in the headwaters of Red Lake River is completely controlled by dam at outlet of Lower Red Lake. Flow partially affected by occasional regulation at Thief and Mud Lakes in Thief River basin (see station 05076000).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1120	1500	e1500	e1300	e1100	e1000	e1350	4880	e3700	4170	e2200	1280
2	1020	1420	e1500	e1300	e1100	e1000	e1500	5270	e3900	8790	e2100	1260
3	1060	1490	e1500	e1300	e1100	e1000	e1700	5270	e4000	11300	e2000	1250
4	1050	2290	e1500	e1260	e1100	e1000	e3000	4390	e3800	11700	e1950	1250
5	1010	2440	e1500	e1220	e1100	e1000	e5000	4020	e3700	11600	e1900	1260
6	1030	1980	e1500	e1200	e1100	e1000	e8000	e4000	e3400	10100	1880	1240
7	964	2000	e1500	e1200	e1080	e1000	e15000	e3980	e3000	8550	1750	1260
8	998	2070	e1500	e1200	e1060	e1000	e13000	e3980	e2800	7240	1670	1320
9	1010	2090	e1500	e1200	e1040	e1000	e11000	e3960	e2500	6250	1640	1380
10	1010	1900	e1500	e1200	e1020	e1000	e10500	e3960	e2200	5580	1600	1330
11	993	1440	e1500	e1180	e1000	e1020	e10000	3830	e2000	5130	1550	1310
12	1080	1260	e1500	e1160	e1000	e1040	e11000	3630	e1900	4850	e1520	1310
13	1110	1490	e1500	e1140	e1000	e1060	e13000	3550	1970	4620	e1500	1320
14	1190	1360	e1500	e1120	e1000	e1080	e15000	3520	2020	4870	e1480	1300
15	1170	1390	e1500	e1110	e1000	e1100	e18000	3330	2110	6200	e1450	1340
16	1230	1440	e1500	e1110	e1000	e1120	e21000	3280	2100	6540	e1420	1430
17	1270	1660	e1500	e1110	e1000	e1140	e24500	3240	2110	5740	e1410	1490
18	1390	2120	e1500	e1110	e1000	e1160	e27500	3450	2130	4880	e1400	1480
19	1370	1720	e1500	e1110	e1000	e1180	e26500	3500	2130	e4100	1400	1450
20	1340	e1700	e1480	e1110	e1000	e1200	24000	3410	2160	e3900	1390	1420
21	1400	e1600	e1460	e1110	e1000	e1220	18900	3250	2190	e3700	1410	1420
22	1430	e1580	e1440	e1110	e1000	e1240	13500	3210	2200	e3500	1450	1380
23	1460	e1560	e1420	e1110	e1000	e1240	11300	3260	2250	e3300	1430	1360
24	1560	e1540	e1400	e1100	e1000	e1240	9940	3760	2750	e3100	1370	1360
25	1580	e1520	e1380	e1100	e1000	e1260	8930	4120	6090	e2900	1380	1350
26	1610	e1510	e1360	e1100	e1000	e1280	8060	4150	7330	e2800	1350	1320
27	1700	e1500	e1340	e1100	e1000	e1300	7320	4050	6370	e2700	1350	1340
28	1670	e1500	e1320	e1100	e1000	e1300	6540	e4000	5660	e2600	1320	1380
29	1700	e1500	e1300	e1100	---	e1300	5850	e3900	5080	e2500	1320	1370
30	1720	e1500	e1300	e1100	---	e1300	5310	e3700	4350	e2400	1300	1370
31	1640	---	e1300	e1100	---	e1300	---	e3500	---	e2300	1290	---
TOTAL	39885	50070	45000	35770	28800	35080	356200	119350	97900	167910	48180	40330
MEAN	1287	1669	1452	1154	1029	1132	11870	3850	3263	5416	1554	1344
MAX	1720	2440	1500	1300	1100	1300	27500	5270	7330	11700	2200	1490
MIN	964	1260	1300	1100	1000	1000	1350	3210	1900	2300	1290	1240
AC-FT	79110	99310	89260	70950	57120	69580	706500	236700	194200	333000	95570	79990
CFSM	.24	.32	.28	.22	.20	.21	2.25	.73	.62	1.03	.29	.26
IN.	.28	.35	.32	.25	.20	.25	2.51	.84	.69	1.19	.34	.28

e Estimated

RED RIVER OF THE NORTH BASIN

05079000 RED LAKE RIVER AT CROOKSTON, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1901 - 1997, BY WATER YEAR (WY)

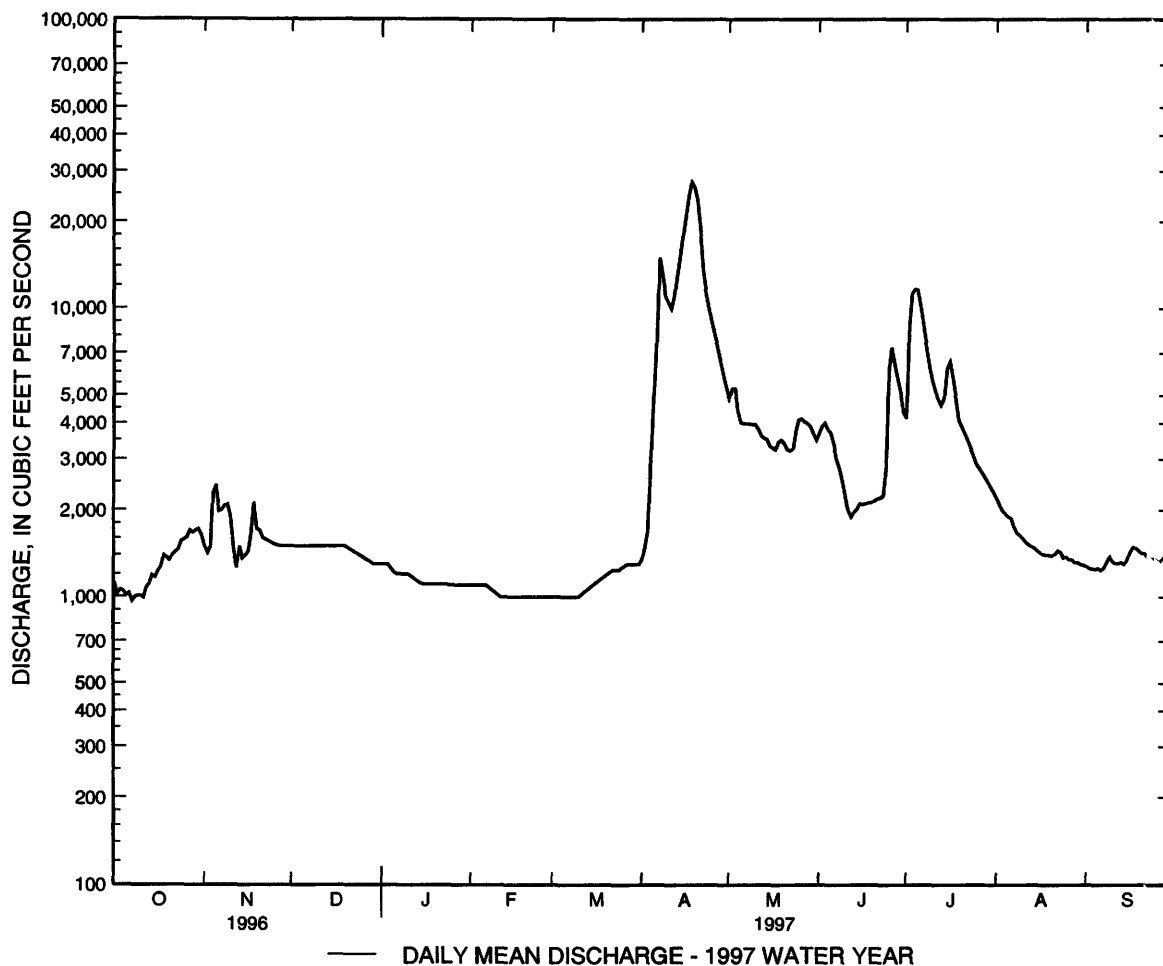
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	827	685	569	511	487	977	3071	2104	1666	1342	833	819
MAX	2836	3172	1900	1663	1464	4257	11870	15290	7205	6851	3868	3009
(WY)	1972	1972	1904	1951	1951	1995	1997	1950	1962	1975	1985	1905
MIN	8.02	10.1	5.34	15.6	17.8	24.9	232	154	80.4	26.2	12.3	8.87
(WY)	1937	1937	1937	1934	1937	1936	1981	1934	1934	1936	1934	1934

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1901 - 1997
ANNUAL TOTAL	946765	1064475	
ANNUAL MEAN	2587	2916	1154
HIGHEST ANNUAL MEAN			3129
LOWEST ANNUAL MEAN			83.6
HIGHEST DAILY MEAN	21400	Apr 20	27500
LOWEST DAILY MEAN	874	Sep 20	964
ANNUAL SEVEN-DAY MINIMUM	927	Sep 15	1000
INSTANTANEOUS PEAK FLOW			28000 ^a
INSTANTANEOUS PEAK STAGE			28.40 ^b
INSTANTANEOUS LOW FLOW			.00 ^c
ANNUAL RUNOFF (AC-FT)	1878000	2111000	835900
ANNUAL RUNOFF (INCHES)	6.68	7.51	2.97
10 PERCENT EXCEEDS	5040	5950	2550
50 PERCENT EXCEEDS	1440	1500	699
90 PERCENT EXCEEDS	1010	1020	115

a Approximately. Measured 27,800 ft³/s this day at 1245 hours.

b From highwater mark, backwater from ice.

c From regulation by power plant upstream.



RED RIVER OF THE NORTH BASIN

05082500 RED RIVER OF THE NORTH AT GRAND FORKS, ND

LOCATION.--Lat 47°55'38", long 97°01'34", in sec. 2, T.151 N., R.50 W., Grand Forks County, Hydrologic Unit 09020301, on the right bank 200 ft upstream from the DeMers Avenue bridge, 0.4 mi downstream from Red Lake River, and at mile 297.6.

DRAINAGE AREA.--30,100 mi², approximately, including 3,800 mi² in closed basins.

PERIOD OF RECORD.--April 1882 to current year. Prior to January 1904 monthly discharge only, published in WSP 1308.

REVISED RECORDS.--WSP 855: 1936(M). WSP 1115: 1942. WSP 1175: 1897(M). WSP 1388: 1904, 1914-15, 1917-19, 1921-22, 1927, 1950. WSP 1728: Drainage area. WRD-ND-81-1: 1882, 1897 (M).

GAGE.--Water-stage recorder. Datum of gage is 779.00 ft above sea level. Oct. 1, 1983 to Sept. 30, 1986, datum of gage was 780.00 ft at same site. Apr. 14, 1965 to Sept. 30, 1983, water-stage recorder 1.9 mi downstream at a datum of 778.35 ft. Nov. 3, 1933 to Apr. 13, 1965, water-stage recorder 0.3 mi upstream at 778.35 ft datum. See WSP 1728 or 1913 for history of changes prior to Nov. 3, 1933.

REMARKS.--Records good except those for period of estimated daily discharges, which are poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1650	2510	e2510	e2060	e1810	e2290	e2750	49100	10100	14000	4250	2580
2	1620	2140	e2460	e2070	e1800	e2280	e3190	46300	9560	14200	4160	2520
3	1500	2290	e2460	e2030	e1800	e2350	e6350	44200	9170	17000	4090	2540
4	1550	2640	e2470	e2020	e1780	e2400	e14500	42500	9070	19300	3980	2630
5	1510	e2950	e2500	e1970	e1720	e2370	e18500	40800	9140	20900	3950	2580
6	1480	e3000	e2460	e1970	e1680	e2360	e21000	39300	8800	21600	3890	2570
7	1450	e2950	e2410	e1910	e1710	e2340	e22000	37700	7970	21000	3840	2540
8	1440	e2800	e2350	e1910	e1720	e2380	e26000	36100	6950	20100	3810	2510
9	1470	e2600	e2330	e1940	e1780	e2370	e28000	34900	6270	18800	3710	2560
10	1500	e2200	e2310	e1930	e1800	e2300	e30200	33500	6020	17200	3580	2680
11	1500	e1950	e2300	e1900	e1800	e2240	e30400	32300	5860	e15800	3450	2690
12	1520	e1850	e2280	e1850	e1840	e2250	e31300	30900	5640	e13800	3350	2630
13	1530	e1800	e2220	e1800	e1850	e2210	e34900	28900	5450	e13000	3280	2560
14	1520	e1750	e2180	e1850	e1850	e2090	e40400	26700	5360	e14000	e3100	2540
15	1540	e1700	e2100	e1900	e1850	e2130	e48900	24600	5280	e15000	e3050	2480
16	1500	e1700	e2080	e1900	e1850	e2160	e63400	22400	5220	e17500	e3000	2490
17	1480	e1670	e2000	e1900	e1850	e2150	e84600	20300	5200	e20000	e2980	2310
18	1570	e1640	e2000	e1880	e1850	e2090	127000	18300	5140	e19800	e2960	2250
19	1600	e1620	e2100	e1850	e1850	e2100	111000	16400	5110	e18000	e2940	2410
20	1640	1610	e2100	e1750	e1850	e2130	109000	14700	5060	e15000	e2920	2480
21	1650	1600	e2050	e1750	e1850	e2140	e111000	13700	5010	e13000	e2920	2450
22	1670	1660	e2000	e1780	e1880	e2150	e110000	12900	4980	e11000	2920	2350
23	1700	1720	e1950	e1800	e1920	e2150	105000	12100	5060	e9200	2930	2280
24	1800	1760	e1900	e1700	e2000	e2170	e97900	11500	5770	e7800	2900	2220
25	1950	e1840	e1920	e1680	e2130	e2180	e88000	11700	10100	e7000	2840	2150
26	2100	e1920	e1980	e1700	e2210	e2190	78400	12400	16100	e6000	2810	2080
27	2230	e2040	e2000	e1750	e2210	e2220	69700	12700	18700	e5500	2780	2010
28	2230	e2190	e2000	e1850	e2230	e2250	e63000	12400	18900	e5000	2750	2060
29	2250	e2370	e2000	e1890	---	e2310	e57200	11900	17700	e4800	2710	2090
30	2470	e2470	e2010	e1900	---	e2410	52700	11300	15800	e4500	2690	2080
31	2550	---	e2020	e1880	---	e2580	---	10600	---	e4300	2650	---
TOTAL	53170	62940	67450	58070	52470	69740	1686290	773100	254490	424100	101190	72320
MEAN	1715	2098	2176	1873	1874	2250	56210	24940	8483	13680	3264	2411
MAX	2550	3000	2510	2070	2230	2580	127000	49100	18900	21600	4250	2690
MIN	1440	1600	1900	1680	1680	2090	2750	10600	4980	4300	2650	2010
AC-FT	105500	124800	133800	115200	104100	138300	3345000	1533000	504800	841200	200700	143400

e Estimated

RED RIVER OF THE NORTH BASIN

05082500 RED RIVER OF THE NORTH AT GRAND FORKS, ND--Continued

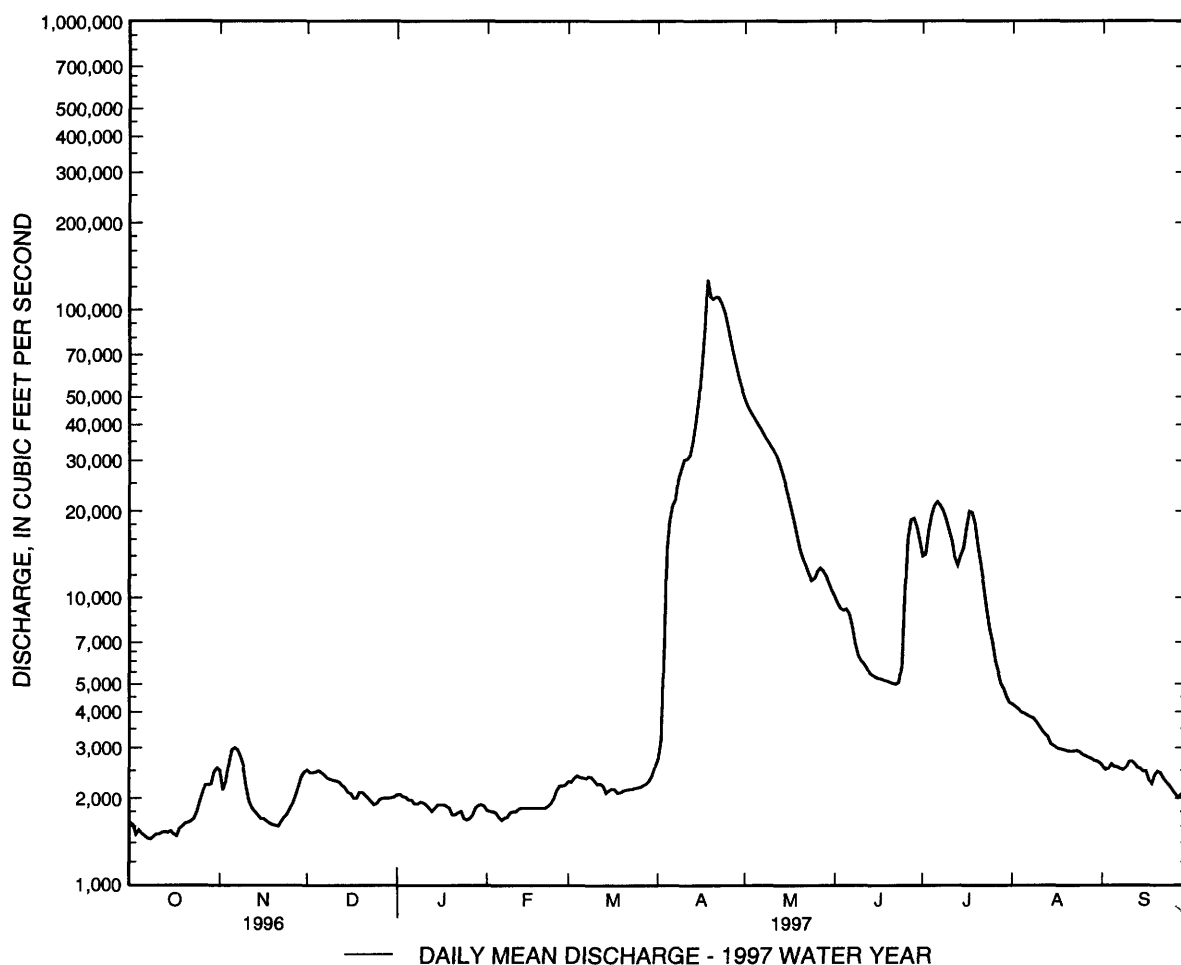
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1904 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1406	1202	976	832	801	2521	9968	5325	3950	3391	1765	1441
MAX	5127	5218	3073	2030	1922	15370	56210	36510	19340	25270	17050	1251
(WY)	1995	1972	1972	1996	1996	1995	1997	1950	1962	1975	1993	1993
MIN	12.1	30.5	17.8	18.8	2.87	42.1	954	373	151	88.8	30.6	20.3
(WY)	1937	1937	1937	1937	1937	1937	1938	1934	1934	1936	1934	1936

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1904 - 1997
ANNUAL TOTAL	2421730	3675330	
ANNUAL MEAN	6617	10070	2780
HIGHEST ANNUAL MEAN			10070
LOWEST ANNUAL MEAN			244
HIGHEST DAILY MEAN	58100	Apr 21	127000
LOWEST DAILY MEAN	1390	Sep 25	1440
ANNUAL SEVEN-DAY MINIMUM	1420	Sep 20	1480
INSTANTANEOUS PEAK FLOW		137000 ^a	Apr 18
INSTANTANEOUS PEAK STAGE		54.35 ^b	Apr 22
ANNUAL RUNOFF (AC-FT)	4804000	7290000	2014000
10 PERCENT EXCEEDS	18300	26300	6110
50 PERCENT EXCEEDS	2300	2470	1350
90 PERCENT EXCEEDS	1630	1720	275

a Maximum observed, affected by breakout flow from the Red River about 20 river miles upstream of gage that re-entered by way of the Red Lake River about 2 river miles upstream of the gage.

b From floodmarks.



RED RIVER OF THE NORTH BASIN

05082500 RED RIVER OF THE NORTH AT GRAND FORKS, ND--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1949, 1956 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (00095)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	HARD-NESS TC TAL AS (MG/L CaCO3) (00000)	
OCT													
01...	1040	1670	--	492	--	--	--	10.0	8.0	--	--	--	
NOV													
04...	1500	2680	--	--	--	--	--	4.0	1.0	--	--	--	
JAN													
02...	1350	2090	--	553	--	--	--	1.5	0.5	--	--	--	
29...	1345	1890	--	468	--	--	--	-6.5	0.5	--	--	--	
MAR													
03...	1610	2380	--	647	--	--	--	-2.0	0.5	--	--	--	
APR													
23...	1115	--	106000	254	--	7.8	742	E10.0	6.5	9.7	81	127	
23...	1400	--	105000	325	--	7.8	742	E10.0	8.5	9.4	83	137	
23...	1830	--	104000	478	--	7.8	742	E10.0	11.5	7.7	73	197	
29...	1115	--	57200	389	--	7.7	--	--	12.0	8.4	--	177	
MAY													
06...	1030	--	39300	--	--	--	--	--	--	--	--	--	
12...	1500	--	30900	--	602	--	--	--	--	--	--	277	
20...	0930	--	14700	--	640	--	--	--	--	--	--	837	
27...	1300	--	12700	--	590	--	--	--	--	--	--	287	
JUL													
07...	1200	21000	--	416	--	--	--	--	17.5	--	--	--	
AUG													
28...	0825	2630	--	456	--	--	--	18.5	23.5	--	--	--	
DATE		COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM TOTAL RECOVER -ABLE (MG/L) (00918)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, TOTAL RECOVER -ABLE (MG/L) (00921)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, TOTAL RECOVER -ABLE (MG/L) (00939)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LI-NITY LAB (MG/L AS CaCO3) (90410)	
APR													
23...	K26	5500	--	30	--	11	3.8	6	0.2	--	4.7	104	
23...	K12	K11000	--	31	--	13	8.4	12	0.3	--	6.1	113	
23...	150	5700	--	49	--	16	13	12	0.4	--	7.3	109	
29...	K34	3400	--	43	--	16	11	11	0.4	--	6.9	121	
MAY													
06...	<1	--	120	--	93	--	--	--	--	9.8	--	159	
12...	--	--	--	63	--	27	21	14	0.5	--	8.4	176	
20...	57	--	--	150	--	110	23	6	0.3	--	7.4	199	
27...	--	--	--	64	--	29	17	12	0.5	--	5.9	153	
DATE		SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SiO2) (00955)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)
APR													
23...	28	2.7	0.13	9.9	155	166	0.23	47500	0.034	0.581	--	0.615	
23...	52	4.3	0.19	13	201	216	0.29	61200	0.057	0.994	--	1.05	
23...	92	12	0.17	15	277	284	0.39	79700	0.060	1.10	--	1.16	
29...	73	5.7	0.16	16	247	263	0.36	40600	0.028	0.594	--	0.622	
MAY													
06...	--	8.0	0.18	--	--	310	--	--	0.020	--	0.290	--	
12...	120	11	0.22	17	379	--	0.52	31700	0.010	0.144	0.170	0.154	
20...	--	11	0.17	--	--	430	--	--	0.020	--	0.190	--	
27...	110	12	0.19	10	365	--	0.50	12500	0.028	0.466	0.500	0.494	

RED RIVER OF THE NORTH BASIN

05082500 RED RIVER OF THE NORTH AT GRAND FORKS, ND--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO- GEN, ORGANIC DIS- SOLVED (MG/L AS N) (00607)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS- SOLVED (MG/L AS N) (00623)	NITRO- GEN, TOTAL (MG/L AS N) (00600)	NITRO- GEN, TOT IN BOT- TOM MA- TERIAL (MG/KG AS N) (00603)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
APR												
23...	--	0.102	0.87	0.59	0.97	0.69	1.6	--	0.255	0.131	--	0.127
23...	--	0.111	1.6	0.64	1.7	0.75	2.7	--	0.397	0.226	--	0.238
23...	--	0.055	1.4	0.64	1.5	0.69	2.6	--	0.362	0.225	--	0.221
29...	--	0.041	0.93	0.64	0.97	0.68	1.6	--	0.313	0.234	--	0.192
MAY												
06...	0.050	0.040	1.5	0.79	1.5	0.83	1.8	--	0.386	0.158	--	0.138
12...	0.155	0.090	--	--	--	--	0.90	1	0.213	0.153	0.199	--
20...	0.090	0.060	1.2	0.78	1.3	0.84	1.5	--	0.278	0.104	--	0.088
27...	0.066	0.067	--	--	--	--	0.94	1.2	0.230	0.144	0.139	--
DATE	PHOS- PHORUS ORGANIC TOTAL (MG/L AS P) (00670)	BORON, TOTAL RECOVER- ABLE (UG/L) (00999)	IRON, TOTAL RECOVER- ABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOVER- ABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	ACETATE VINYL WATER UNFLTRD RECOVER (UG/L) (77057)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	ACETONE WATER WHOLE TOTAL (UG/L) (81552)	ACI- FLUOR- FEN WATER UNFLTRD REC (UG/L) (79193)	ACRO- LEIN TOTAL (UG/L) (34210)	ACRYLO- NITRILE TOTAL (UG/L) (34215)
APR												
23...	0.25	--	--	21	--	4.6	<10.0	<0.002	<10.0	--	<4.00	<4.00
23...	0.40	--	--	7.1	--	7.7	<10.0	0.015	<10.0	--	<4.00	<4.00
23...	0.36	--	--	9.0	--	12	<10.0	<0.002	<10.0	--	<4.00	<4.00
29...	0.31	--	--	14	--	5.1	<5.00	<0.010	E1.00	--	<2.00	<2.00
MAY												
06...	0.39	--	6300	--	240	--	--	--	--	--	--	--
12...	0.01	0	--	<7.0	--	<2.0	--	--	<50.0	<0.05	--	--
20...	0.28	--	--	--	--	<10	--	--	--	--	--	--
27...	0.09	--	--	<7.0	--	<2.0	--	--	<50.0	<0.05	--	--
DATE	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ALDI- CARB WATER WHOLE TOT.REC (UG/L) (82619)	ALDI- CARB SULFONE WATER WHOLE TOT.REC (UG/L) (82587)	ALDICAR SULF- OXIDE WATER WHOLE TOT.REC (UG/L) (82586)	ALDRIN, TOTAL (UG/L) (39330)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	ATRA- ZINE WATER UNFLTRD REC (UG/L) (39630)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)	ALPHA BHC TOTAL (UG/L) (39337)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	BENZENE TOTAL (UG/L) (34030)
APR												
23...	--	<0.002	--	--	--	--	<0.002	--	0.022	--	<0.002	E0.070
23...	--	E0.002	--	--	--	--	<0.002	--	0.039	--	<0.002	<0.100
23...	--	<0.002	--	--	--	--	<0.002	--	0.035	--	<0.002	0.206
29...	--	<0.002	--	--	--	--	<0.002	--	0.052	--	<0.002	<0.050
MAY												
12...	<0.200	--	<0.500	<0.5	<0.5	<0.010	--	<0.250	--	<0.010	--	<0.500
27...	<0.200	--	<0.500	<0.5	<0.5	<0.010	--	<0.250	--	<0.010	--	<0.500
DATE	BENZENE O-DI- CHLORO- WATER UNFLTRD REC (UG/L) (34536)	BENZENE 1,3-DI- CHLORO- WATER UNFLTRD REC (UG/L) (34566)	BENZENE 1,4-DI- CHLORO- WATER UNFLTRD REC (UG/L) (34571)	BENZENE N-BUTYL WATER UNFLTRD REC (UG/L) (77342)	BENZENE N-PROPY WATER UNFLTRD REC (UG/L) (77224)	BENZENE SEC BUTYL- WATER UNFLTRD REC (UG/L) (77350)	BENZENE TERT- BUTYL- WATER UNFLTRD REC (UG/L) (77353)	BENZENE 1,2,4- TRI- CHLORO- WAT UNF REC (UG/L) (34551)	BENZENE 123-TRI METHYL- WATER UNFLTRD RECOVER (UG/L) (77221)	BENZENE 124-TRI METHYL UNFLTRD RECOVER (UG/L) (77222)	BENZENE 135-TRI METHYL UNFLTRD REC (UG/L) (77226)	BROMO- ETHENE WATER UNFLTRD RECOVER (UG/L) (50002)
APR												
23...	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.400	<0.100	E0.050	<0.100	<0.200
23...	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.400	E0.010	E0.030	<0.100	<0.200
23...	<0.100	<0.100	<0.100	E0.010	E0.020	<0.100	<0.100	<0.400	E0.070	0.227	E0.050	<0.200
29...	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.200	<0.050	E0.010	<0.050	<0.100
MAY												
12...	<0.500	--	--	<0.500	<0.500	<0.500	<0.500	<0.500	--	--	<0.500	--
27...	<0.500	--	--	<0.500	<0.500	<0.500	<0.500	<0.500	--	--	<0.500	--

RED RIVER OF THE NORTH BASIN

05082500 RED RIVER OF THE NORTH AT GRAND FORKS, ND--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	BROMO- FORM TOTAL (UG/L) (32104)	BRO- MOXYNIL WATER, FLTRD, GF 0.7U REC (UG/L) (49311)	2BUTENE TRANS-1 4-DI- CHLORO UNFLTRD RECOVER (UG/L) (73547)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	CAR- BARYL WATER FLTRD GF, REC (UG/L) (82680)	CARBON- TETRA- CHLO- RIDE TOTAL (UG/L) (32102)	CARBO- FURAN WATER TOT.REC (UG/L) (82615)	CARBO- FURAN WATER FLTRD GF, REC (UG/L) (82674)	CARBON DI- SULFIDE WATER WHOLE TOTAL (UG/L) (77041)	CHLORO- BENZENE TOTAL (UG/L) (34301)	CHLORO- FORM TOTAL (UG/L) (32106)	CHLOR- PYRIFOS TOTAL (UG/L) (81403)
APR												
23...	<0.400	--	<10.0	<0.002	<0.003	<0.100	--	<0.003	<0.100	<0.100	<0.100	--
23...	<0.400	--	<10.0	<0.002	<0.003	<0.100	--	<0.003	<0.100	<0.100	<0.100	--
23...	<0.400	--	<10.0	<0.002	<0.003	<0.100	--	E0.017	<0.100	<0.100	<0.100	--
29...	<0.200	--	<5.00	<0.002	<0.003	<0.050	--	E0.050	<0.050	E0.010	E0.010	--
MAY												
12...	<0.500	<0.100	--	--	--	--	<0.500	--	--	<0.500	<0.500	<1.0^
27...	<0.500	<0.100	--	--	--	--	<0.500	--	--	<0.500	<0.500	<1.0^
DATE	CHLOR- PYRIFOS DIS- DATE (UG/L) (38933)	CHLORO- DI- BROMO- METHANE SOLVED (UG/L) (32105)	CHLORO- ETHANE TOTAL (UG/L) (34311)	O- CHLORO- TOLUENE WATER WHOLE TOTAL (UG/L) (77275)	CYANA- ZINE, WATER, DISS, TOTAL (UG/L) (81757)	CYANA- ZINE, WATER, DISS, TOTAL (UG/L) (04041)	DCPA WATER FLTRD 0.7 U REC (UG/L) (82682)	P,P'- DDD UNFILT GF, REC (UG/L) (39360)	P,P'- DDE, RECOVER (UG/L) (39365)	P,P' DDE TOTAL (UG/L) (34653)	P,P'- DDT UNFILT DISSOLVE (UG/L) (39370)	DEETHYL ATRA- ZINE, WATER, DISS, RECOVER (UG/L) (04040)
APR												
23...	<0.004	<0.200	<0.200	<0.100	--	<0.004	<0.002	--	--	<0.006	--	E0.0^7
23...	<0.004	<0.200	<0.200	<0.100	--	<0.004	<0.002	--	--	<0.006	--	E0.0^2
23...	<0.004	<0.200	<0.200	<0.100	--	<0.004	<0.002	--	--	<0.006	--	E0.0^3
29...	<0.004	<0.100	<0.100	<0.050	--	<0.004	<0.002	--	--	<0.006	--	E0.0^6
MAY												
12...	--	<0.500	<0.500	<0.500	<0.050	--	--	<0.010	<0.010	--	<0.010	--
27...	--	<0.500	<0.500	<0.500	<0.050	--	--	<0.010	<0.010	--	<0.010	--
DATE	DI- AZINON, TOTAL (UG/L) (39570)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	DIBROMO CHLORO- PROPANE WATER WHOLE TOT.REC (UG/L) (82625)	DI- BROMO- METHANE WATER WHOLE RECOVER (UG/L) (30217)	1,2- DIBROMO ETHANE WATER WHOLE TOTAL (UG/L) (77651)	DICAMBA TOTAL (UG/L) (82052)	DI- CHLORO- BROMO- METHANE TOTAL (UG/L) (32101)	DI- CHLORO- FLUORO- METHANE TOTAL (UG/L) (34668)	1,1-DI- CHLORO- ETHANE TOTAL (UG/L) (34496)	1,2-DI- CHLORO- ETHANE TOTAL (UG/L) (32103)	CIS-1,2- DI- CHLORO- ETHENE WATER TOTAL (UG/L) (77093)	1,1-DI- CHLORO- ETHANE TOTAL (UG/L) (345^1)
APR												
23...	--	<0.002	<1.00	<0.200	<0.200	--	<0.200	<0.400	<0.100	<0.100	<0.100	<0.200
23...	--	<0.002	<1.00	<0.200	<0.200	--	<0.200	<0.400	<0.100	<0.100	<0.100	<0.200
23...	--	<0.002	<1.00	<0.200	<0.200	--	<0.200	<0.400	<0.100	<0.100	<0.100	<0.2^0
29...	--	<0.002	<0.500	<0.100	<0.100	--	<0.100	<0.200	<0.050	<0.050	<0.050	<0.100
MAY												
12...	<1.00	--	--	<0.500	--	<0.100	--	--	<0.500	<0.500	--	<0.500
27...	<0.100	--	--	<0.500	--	<0.100	--	--	<0.500	<0.500	--	<0.500
DATE	1,2-DI- CHLORO- PROPANE TOTAL (UG/L) (34541)	1,3-DI- CHLORO- PROPANE WAT. WH TOTAL (UG/L) (77173)	2,2-DI- CHLORO- PROPANE WAT. WH TOTAL (UG/L) (77170)	1,1-DI- CHLORO- PROPENE, WAT. WH TOTAL (UG/L) (77168)	CIS- 1,3-DI- CHLORO- PROPENE TOTAL (UG/L) (34704)	DICHLOR PROP, WATER, FLTRD, GF 0.7U REC (UG/L) (49302)	DI- ELDRIN TOTAL (UG/L) (39380)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	2,6-DI- ETHYL ANILINE WAT FLT GF, REC (UG/L) (82660)	DINOSEB WATER UNFLTRD REC (UG/L) (82226)	DISUL- FOTON WATER FLTRD GF, REC (UG/L) (82677)	EPTC WATER FLTRD GF, REC (UG/L) (82668)
APR												
23...	<0.100	<0.100	<0.100	<0.100	<0.200	--	--	<0.001	<0.003	--	<0.017	0.0^9
23...	<0.100	<0.100	<0.100	<0.100	<0.200	--	--	<0.001	<0.003	--	<0.017	0.0^2
23...	<0.100	<0.100	<0.100	<0.100	<0.200	--	--	<0.001	<0.003	--	<0.017	0.0^9
29...	<0.050	<0.050	<0.050	<0.050	<0.100	--	--	<0.001	<0.003	--	<0.017	0.0^31
MAY												
12...	<0.500	--	--	<0.500	<0.500	<0.200	<0.010	--	--	<0.20	--	--
27...	<0.500	--	<0.500	<0.500	<0.500	<0.200	<0.010	--	--	<0.20	--	--

RED RIVER OF THE NORTH BASIN

05082500 RED RIVER OF THE NORTH AT GRAND FORKS, ND--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	ENDO-SULFAN-I WATER WHOLE REC (UG/L) (34361)	ENDO-SULFAN-II TOTAL (UG/L) (34356)	ENDO-SULFAN TOTAL (UG/L) (34351)	ENDRIN WATER UNFLTRD REC (UG/L) (39390)	ENDRIN ALDE- HYDE TOTAL (UG/L) (34366)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	ETHAL- FLUR- ALIN WATER WHOLE REC (UG/L) (38787)	ETHANE HEXA- CHLORO- WATER UNFLTRD RECOVER (UG/L) (34396)	ETHANE, 1,1,2,2- TETRA- CHLORO- WAT UNF REC (UG/L) (34516)	ETHANE, 1112- TETRA- CHLORO- WAT UNF REC (UG/L) (77562)	ETHER TERT- BUTYL UNFLTRD RECOVER (UG/L) (50004)	ETHER TERT- PENTYL METHYL- UNFLTRD RECOVER (UG/L) (50005)
APR												
23...	--	--	--	--	--	<0.004	--	<0.100	<0.200	<0.100	<0.200	<0.200
23...	--	--	--	--	--	<0.004	--	<0.100	<0.200	<0.100	<0.200	<0.200
23...	--	--	--	--	--	<0.004	--	<0.100	<0.200	<0.100	<0.200	<0.200
29...	--	--	--	--	--	<0.004	--	<0.050	<0.100	<0.050	<0.100	<0.100
MAY												
12...	<0.010	<0.010	<0.010	<0.010	<0.010	--	<0.01	--	--	--	--	--
27...	<0.010	<0.010	<0.010	<0.010	<0.010	--	<0.01	--	--	--	--	--

DATE	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	ETHYL- BENZENE TOTAL (UG/L) (34371)	TRI- FLURA- LIN TOTAL RECOVER (UG/L) (39030)	FONOFOS WATER DISS REC (UG/L) (04095)	FREON- 113 WATER UNFLTRD REC (UG/L) (77652)	FURAN TETRA- HYDRO- WATER UNFLTRD RECOVER (UG/L) (81607)	HEPTA- CHLOR, TOTAL (UG/L) (39410)	HEPTA- CHLOR EPOXIDE TOTAL (UG/L) (39420)	HEXA- CHLORO- BUT- ADIENE TOTAL (UG/L) (39702)	2-HEXA- NONE WATER WHOLE TOTAL (UG/L) (77103)	ISO- DURENE WATER UNFLTRD RECOVER (UG/L) (50000)
APR											
23...	<0.003	E0.030	--	<0.003	<0.100	<10.0	--	--	<0.400	<10.0	<0.100
23...	<0.003	E0.020	--	<0.003	<0.100	<10.0	--	--	<0.400	<10.0	<0.100
23...	<0.003	E0.100	--	<0.003	<0.100	<10.0	--	--	<0.400	<10.0	E0.040
29...	<0.003	<0.050	--	<0.003	E0.010	<5.00	--	--	<0.200	<5.00	<0.050
MAY											
12...	--	<0.500	<0.010	--	--	--	<0.010	<0.010	<0.500	<50.0	--
27...	--	<0.500	<0.010	--	--	--	<0.010	<0.010	<0.500	<50.0	--

DATE	ISO- PROPYL- BENZENE WATER WHOLE REC (UG/L) (77223)	P-ISO- PROPYL- TOLUENE WATER WHOLE REC (UG/L) (77356)	LINDANE TOTAL (UG/L) (39782)	LINDANE DIS- SOLVED (UG/L) (39341)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	MCPA WATER UNFLTRD REC (UG/L) (30192)	MALA- THION, TOTAL (UG/L) (39530)	MALA- THION, DIS- SOLVED (UG/L) (39532)	META/ PARA- XYLENE WATER UNFLTRD REC (UG/L) (85795)	METHAC- RYLATE ETHYL- WATER UNFLTRD RECOVER (UG/L) (73570)	METHAC- RYLATE METHYL WATER UNFLTRD RECOVER (UG/L) (81597)
APR											
23...	<0.100	<0.100	--	<0.004	<0.002	--	--	<0.005	E0.100	<2.00	<2.00
23...	<0.100	<0.100	--	<0.004	<0.002	--	--	<0.005	E0.050	<2.00	<2.00
23...	E0.007	<0.100	--	<0.004	<0.002	--	--	0.011	0.423	<2.00	<2.00
29...	<0.050	<0.050	--	<0.004	<0.002	--	--	<0.005	E0.030	<1.00	<1.00
MAY											
12...	<0.500	<0.500	<0.01	--	--	<50	<0.040	--	--	--	--
27...	<0.500	<0.500	<0.01	--	--	<50	<0.040	--	--	--	--

RED RIVER OF THE NORTH BASIN

05082500 RED RIVER OF THE NORTH AT GRAND FORKS, ND--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	METHANE BROMO- CHLORO- WAT UNFLTRD REC (UG/L) (77297)	METHO- MYL TOTAL (UG/L) (39051)	METH- OXY- CHLOR, TOTAL (UG/L) (39480)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	METHYL ACRY- LATE WATER UNFLTRD RECOVER (UG/L) (49991)	METHYL- BROMIDE TOTAL (UG/L) (34413)	METHYL- CHLO- RIDE TOTAL (UG/L) (34418)	METHYL- ETHYL- KETONE WATER WHOLE TOTAL (UG/L) (81595)	METHYL- ENE CHLO- RIDE TOTAL (UG/L) (34423)	METHYL IODIDE WATER UNFLTRD RECOVER (UG/L) (77424)	METHYL- ISOB- BUTYL- KETONE WAT.WH. TOTAL (UG/L) (78133)
APR											
23...	<0.200	--	--	<0.001	<4.00	<0.200	<0.400	<10.0	E0.100	<0.100	<10.0
23...	<0.200	--	--	<0.001	<4.00	<0.200	E0.030	E0.900	<0.200	<0.100	<10.0
23...	<0.200	--	--	<0.001	<4.00	<0.200	<0.400	E1.00	0.308	<0.100	<10.0
29...	<0.100	--	--	<0.001	<2.00	<0.100	<0.200	3.65	E0.010	<0.050	<5.00
MAY											
12...	--	<0.500	<0.100	--	--	--	--	--	--	--	--
27...	--	<0.500	<0.100	--	--	--	--	--	--	--	--
DATE	METHYL PARA- THION, TOTAL (UG/L) (39600)	METHYL PARA- THION WAT FLT 0.7 U GF, REC (UG/L) (82667)	METHYL TERT- BUTYL ETHER WAT UNF REC (UG/L) (78032)	METOLA- CHLOR WATER WHOLE TOT.REC (UG/L) (82612)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	METRI- BUZIN IN WATER WHOLE (UG/L) (81408)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	NAPHTH- ALENE TOTAL (UG/L) (34696)	OXYAMYL WATER WHOLE TOT.REC (UG/L) (82613)
APR											
23...	--	<0.006	<0.200	--	0.011	--	<0.004	<0.004	<0.003	E0.050	--
23...	--	<0.006	<0.200	--	0.049	--	0.011	<0.004	<0.003	0.329	--
23...	--	<0.006	<0.200	--	0.042	--	<0.004	<0.004	<0.003	E0.100	--
29...	--	<0.006	<0.100	--	0.046	--	<0.004	<0.004	<0.003	<0.200	--
MAY											
12...	<0.450	--	--	<0.080	--	<0.02	--	--	--	--	<7.5
27...	<0.450	--	--	<0.080	--	<0.02	--	--	--	--	<7.5
DATE	PARA- THION, DIS- SOLVED (UG/L) (39542)	PEB- ULATE WATER FLTRD 0.7 U GF, REC (UG/L) (82669)	PENDI- METH- ALIN TOTAL (UG/L) (79190)	PENDI- METH- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	PENTA- CHLORO- PHENOL TOTAL (UG/L) (39032)	PER- METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	PIC- LORAM UNFILT RECOVER (UG/L) (39720)	PREH- NITENE WATER UNFLTRD RECOVER (UG/L) (49999)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82176)
APR											
23...	<0.004	<0.004	--	<0.004	--	<0.005	<0.002	--	<0.100	<0.018	<9.003
23...	<0.004	<0.004	--	<0.004	--	<0.005	<0.002	--	<0.100	<0.018	<9.003
23...	<0.004	<0.004	--	<0.004	--	<0.005	<0.002	--	E0.050	<0.018	<0.003
29...	<0.004	<0.004	--	<0.004	--	<0.005	<0.002	--	<0.050	<0.018	<0.003
MAY											
12...	--	--	<0.01	--	<0.040	--	--	<0.100	--	--	--
27...	--	--	<0.01	--	<0.040	--	--	<0.100	--	--	--

RED RIVER OF THE NORTH BASIN

05082500 RED RIVER OF THE NORTH AT GRAND FORKS, ND--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	PROPENE 3- CHLORO- WATER UNFLTRD RECOVER (UG/L) (78109)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	SILVEX, TOTAL (UG/L) (39760)	SIMA- ZINE TOTAL (UG/L) (39055)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	STYRENE TOTAL (UG/L) (77128)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)
	APR										
23...	<0.007	<0.200	<0.004	<0.013	--	--	<0.005	<0.100	<0.010	<0.007	<0.013
23...	<0.007	<0.200	<0.004	<0.013	--	--	<0.010	<0.100	<0.010	<0.007	<0.013
23...	<0.007	<0.200	<0.004	<0.013	--	--	<0.005	<0.100	<0.010	<0.007	<0.013
29...	<0.007	<0.100	<0.004	<0.013	--	--	0.008	<0.050	<0.010	<0.007	<0.013
MAY											
12...	--	--	--	--	<0.200	<0.450	--	<0.500	--	--	--
27...	--	--	--	--	<0.200	<0.450	--	<0.500	--	--	--
DATE	TETRA- CHLORO- ETHYL- ENE TOTAL (UG/L) (34475)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	TOLUENE TOTAL (UG/L) (34010)	TOLUENE P-CHLOR WATER UNFLTRD REC (UG/L) (77277)	TOLUENE O-ETHYL WATER UNFLTRD RECOVER (UG/L) (77220)	TRANS- 1,3-DI- CHLORO- PROPENE TOTAL (UG/L) (34699)	TOX- APHENE, TOTAL (UG/L) (39400)	1,2- TRANSDI CHLORO- ETHENE TOTAL (UG/L) (34546)	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	1,1,1- TRI- CHLORO- ETHANE TOTAL (UG/L) (34506)	1,1,2- TRI- CHLORO- ETHANE TOTAL (UG/L) (34511)
APR											
23...	<0.100	<0.002	0.211	<0.100	<0.100	<0.200	--	<0.100	0.038	<0.100	<0.200
23...	<0.100	<0.002	E0.100	<0.100	<0.100	<0.200	--	<0.100	0.078	E0.004	<0.200
23...	<0.100	<0.002	0.620	<0.100	E0.040	<0.200	--	<0.100	0.062	<0.100	<0.200
29...	E0.002	<0.002	<0.050	<0.050	<0.050	<0.100	--	<0.050	0.048	E0.002	<0.100
MAY											
12...	<0.500	--	<0.500	--	--	<0.500	<1.00	--	--	<0.500	<0.500
27...	<0.500	--	<0.500	--	--	<0.500	<1.00	--	--	<0.500	<0.500
DATE	TRI- CHLORO- ETHYL- ENE TOTAL (UG/L) (39180)	123-TRI CHLORO- PROPANE WATER WHOLE TOTAL (UG/L) (77443)	TRI- FLURA- LIN TOTAL RECOVER (UG/L) (39030)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)	TURBID- ITY (SEVER- ITY) (01350)	2,4-D, TOTAL (UG/L) (39730)	2,4,5-T TOTAL (UG/L) (39740)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	VINYL CHLO- RIDE TOTAL (UG/L) (39175)	O- XYLENE WATER WHOLE TOTAL (UG/L) (77135)	
APR											
23...	<0.100	<0.400	--	0.010	E2	--	--	<0.003	<0.200	E0.060	
23...	E0.007	<0.400	--	0.018	3	--	--	<0.003	<0.200	E0.020	
23...	<0.100	<0.400	--	0.022	--	--	--	<0.003	<0.200	E0.100	
29...	E0.005	<0.200	--	0.013	3	--	--	<0.003	<0.100	E0.010	
MAY											
12...	<0.500	<0.500	<0.010	--	--	<0.100	<0.150	--	--	--	
27...	<0.500	<0.500	<0.010	--	--	<0.100	<0.150	--	--	--	

RED RIVER OF THE NORTH BASIN
05087500 MIDDLE RIVER AT ARGYLE, MN

LOCATION.--Lat 48°20'25", long 96°48'58", in NE 1/4 NW 1/4 sec. 15, T.156 N., R.48 W., Marshall County, Hydrologic Unit 09020309, on left bank 30 ft upstream of bridge on County Highway 4 in Argyle and 14 mi upstream from mouth.

DRAINAGE AREA.--265 mi²

PERIOD OF RECORD.--March to September 1945, October 1950 to September 1981, February 1982 to current year. Monthly discharge only for some periods, published in WSP 1728. October 1981 to January 1982, operated as a high-flow partial-record station.

GAGE.--Water-stage recorder. Datum of gage is 828.53 ft above mean sea level. Prior to Nov. 8, 1951, nonrecording gage and Nov. 8, 1951 to Sept. 18, 1952, water stage recorder at site 800 ft downstream at datum 1.0 ft higher. Sept. 19, 1952 to June 28, 1982, recording gage at site 800 feet downstream at present datum. June 29, 1982 to Sept. 20, 1983, nonrecording gage at present site and datum.

REMARKS.--Records fair except those for estimated daily discharges, which are poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 1950 reached a stage of 15.25 ft present datum, site then in use, from floodmarks, discharge, 2,790 ft³/s.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.85	15	e5.6	e3.2	e2.7	e2.0	e60	387	e40	15	12	1.5
2	.82	15	e5.7	e3.1	e2.6	e2.0	e150	348	e37	63	9.8	1.8
3	.72	15	e5.4	e3.0	e2.6	e2.0	e280	330	e34	47	8.2	1.6
4	.60	16	e5.5	e3.0	e2.6	e2.0	e270	203	31	211	7.0	1.7
5	.55	e16	e5.4	e3.0	e2.5	e2.1	e260	170	27	552	6.9	2.5
6	.55	e15	e5.4	e2.9	e2.5	e2.1	e260	144	26	882	6.2	2.0
7	.58	e15	e5.2	e2.9	e2.4	e2.1	e255	129	30	896	5.6	1.8
8	.64	e14	e5.2	e2.8	e2.4	e2.1	e250	128	34	741	5.1	2.4
9	.69	e15	e5.2	e2.8	e2.4	e2.1	e250	157	34	583	4.6	2.0
10	.77	e15	e5.0	e2.7	e2.3	e2.2	e260	224	33	452	3.9	1.6
11	.77	e14	e5.0	e2.7	e2.3	e2.3	e260	266	27	339	3.3	1.2
12	.80	e13	e5.0	e2.6	e2.3	e2.3	e270	251	22	255	2.8	1.2
13	.84	e11	e5.0	e2.6	e2.2	e2.3	e280	223	15	224	2.3	1.6
14	.89	e10	e4.9	e2.7	e2.2	e2.3	e300	191	11	190	2.1	2.3
15	.88	e9.0	e4.8	e2.7	e2.3	e2.4	e350	161	9.7	204	3.1	1.9
16	.80	e8.0	e4.7	e2.8	e2.2	e2.4	e400	145	7.6	292	4.3	4.6
17	.72	e7.6	e4.6	e2.8	e2.2	e2.5	e560	139	8.2	300	3.2	6.0
18	.81	e7.0	e4.5	e2.9	e2.2	e2.5	e3000	133	9.4	238	2.6	9.8
19	.83	e6.4	e4.4	e2.8	e2.3	e2.6	3800	115	7.7	186	3.7	4.4
20	.89	e6.0	e4.3	e2.8	e2.3	e2.6	3380	103	6.3	141	4.1	3.2
21	1.2	e5.6	e4.3	e2.7	e2.3	e2.6	2740	97	4.5	110	3.6	3.4
22	2.0	e5.4	e4.2	e2.7	e2.3	e2.6	2360	88	3.9	89	3.5	3.1
23	3.2	e5.2	e4.1	e2.8	e2.3	e2.6	2030	82	4.5	75	3.0	3.4
24	6.5	e5.0	e4.0	e2.7	e2.3	e2.7	1650	78	6.4	65	2.7	2.4
25	6.9	e4.8	e3.9	e2.6	e2.2	e2.8	1310	75	4.2	52	2.7	2.5
26	9.8	e4.5	e3.9	e2.5	e2.2	e2.9	1090	e68	3.3	42	2.9	2.8
27	11	e4.3	e3.8	e2.4	e2.2	e3.0	948	e62	4.6	33	2.0	3.1
28	9.3	e4.5	e3.7	e2.4	e2.1	e3.0	847	e58	17	25	1.8	5.4
29	10	e5.0	e3.6	e2.4	---	e3.1	603	e50	13	21	2.2	5.2
30	14	e5.4	e3.5	e2.5	---	e3.3	496	e47	12	18	1.8	4.5
31	15	---	e3.3	e2.7	---	e3.5	---	e44	---	15	1.5	---
TOTAL	103.90	292.7	143.1	85.2	65.4	77.0	28969	4696	523.3	7356	128.5	90.9
MEAN	3.35	9.76	4.62	2.75	2.34	2.48	966	151	17.4	237	4.15	3.03
MAX	15	16	5.7	3.2	2.7	3.5	3800	387	40	896	12	9.8
MIN	.55	4.3	3.3	2.4	2.1	2.0	60	44	3.3	15	1.5	1.2
AC-FT	206	581	284	169	130	153	57460	9310	1040	14590	255	180
CFSM	.01	.04	.02	.01	.01	.01	3.64	.57	.07	.90	.02	.01
IN.	.01	.04	.02	.01	.01	.01	4.07	.66	.07	1.03	.02	.01

e Estimated

RED RIVER OF THE NORTH BASIN

05087500 MIDDLE RIVER AT ARGYLE, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1997, BY WATER YEAR (WY)

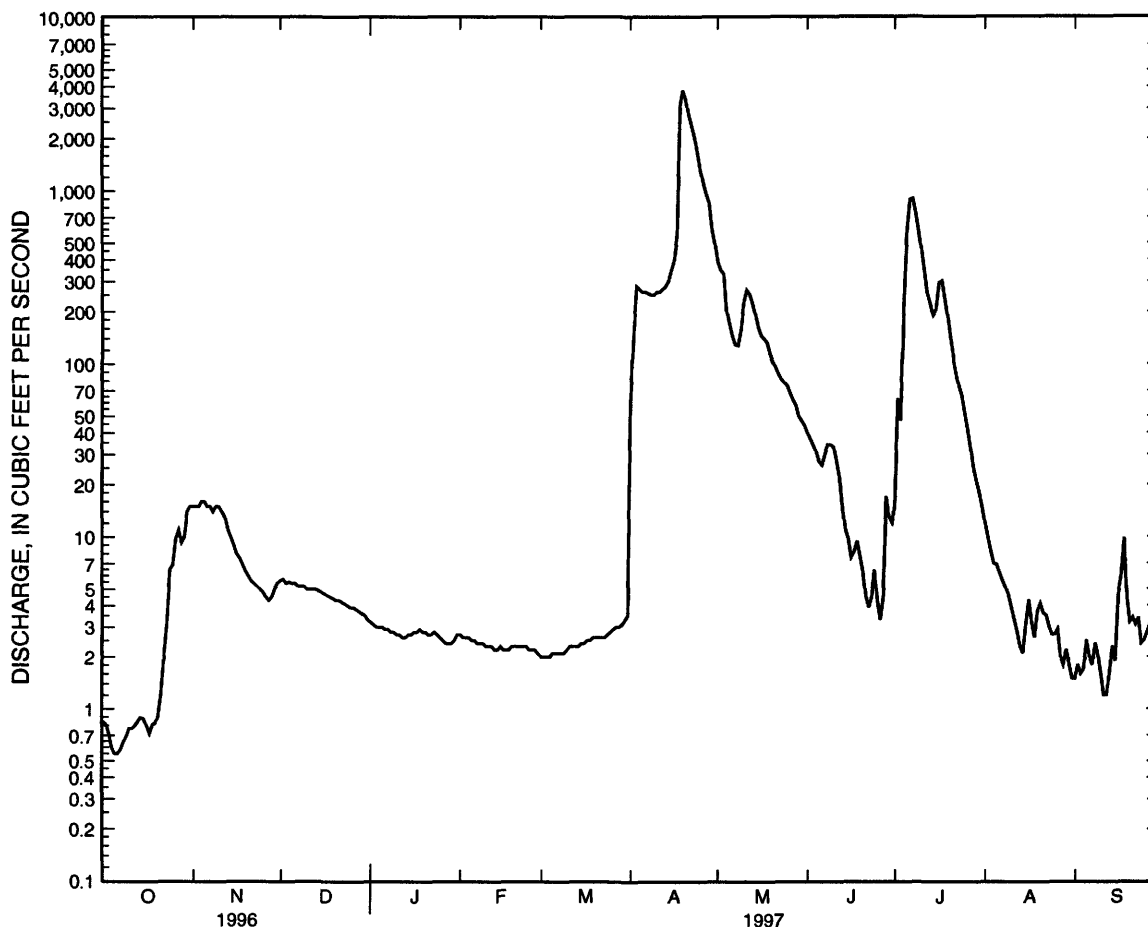
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	9.84	7.51	2.85	1.25	.86	30.8	222	89.7	66.5	57.8	10.7	15.6
MAX	94.1	108	22.2	8.77	3.72	335	963	896	660	688	265	272
(WY)	1983	1995	1995	1995	1995	1995	1997	1996	1970	1975	1993	1993
MIN	.000	.000	.000	.000	.000	.000	.20	2.12	.37	.000	.000	.000
(WY)	1954	1954	1954	1953	1953	1954	1991	1981	1973	1961	1961	1952

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1945 - 1997
ANNUAL TOTAL	46619.29	42531.00	
ANNUAL MEAN	127	117	43.0 ^a
HIGHEST ANNUAL MEAN			127
LOWEST ANNUAL MEAN			1.60
HIGHEST DAILY MEAN	4800	May 19	4800
LOWEST DAILY MEAN	.55	Oct 5, 6	.00 ^b
ANNUAL SEVEN-DAY MINIMUM	.62	Oct 3	.00
INSTANTANEOUS PEAK FLOW		4330	5020
INSTANTANEOUS PEAK STAGE		17.96	18.27 ^c
ANNUAL RUNOFF (AC-FT)	92470	84360	31130
ANNUAL RUNOFF (CFSM)	.48	.44	.16
ANNUAL RUNOFF (INCHES)	6.54	5.97	2.20
10 PERCENT EXCEEDS	173	260	87
50 PERCENT EXCEEDS	4.1	4.6	2.3
90 PERCENT EXCEEDS	.92	2.0	.00

a Median of annual mean discharges is 38 ft³/s.

b Many days, several years.

c From floodmark.



— DAILY MEAN DISCHARGE - 1997 WATER YEAR

RED RIVER OF THE NORTH BASIN

05092000 RED RIVER OF THE NORTH AT DRAYTON, ND

LOCATION.--Lat 48°34'20", long 97°08'50", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 24, T.159 N., R.51 W., Pembina County, Hydrologic Unit 09020311, on downstream side of bridge on North Dakota State Highway 11, at the North Dakota-Minnesota border, 1.5 mi northeast of Drayton, and at mile 206.7.

DRAINAGE AREA.--34,800 mi², approximately, includes 3,800 mi² in closed basins.

PERIOD OF RECORD.--April 1936 to June 1937, April 1941 to current year (fragmentary prior to April 1949).

REVISED RECORDS.--WSP 1388 1949-50. WSP 1728: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 755.00 ft above sea level (Minnesota highway bench mark). Prior to Nov. 30, 1954, nonrecording gage at site 1.5 mi upstream at datum 1.59 ft higher.

REMARKS.--Records fair.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 1897 reached a stage of about 41 ft, at site and datum in use prior to Nov. 30, 1954.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1440	2370	e2700	e1950	e1900	e2200	e3000	71400	16600	e19000	5000	2810
2	1510	2440	e2800	e1950	e1900	e2300	e3600	66600	e15300	e17000	4810	2780
3	1640	2420	e2800	e1950	e1900	e2300	5200	62700	e14000	e15000	4640	2740
4	e1700	2350	e2800	e1950	e1900	e2400	7960	58700	e13000	15200	4510	2700
5	e1700	2370	e2700	e1950	e1800	e2400	12600	56400	e12000	16700	4380	2700
6	e1600	2730	e2700	e1950	e1800	e2450	17300	53000	e11000	17900	4310	2700
7	e1600	3070	e2700	e2000	e1800	e2500	20000	50200	10300	18800	4280	2720
8	e1600	3140	e2700	e2000	e1700	e2500	e23300	49500	9660	20400	4240	2730
9	e1550	3140	e2600	e2000	e1700	e2500	e26300	46600	8930	21200	4190	2720
10	e1550	2920	e2500	e2000	e1700	e2500	28700	43500	8190	21300	4120	2720
11	e1550	2900	2450	e2000	e1750	e2500	29400	42200	7600	20600	3990	2760
12	e1600	2550	2440	e2000	e1800	e2500	e32000	40500	7160	e20000	3820	2860
13	e1600	2130	2440	e2000	e1800	e2450	33100	38900	6690	e18000	3680	2870
14	e1600	2040	2410	e2000	e1850	e2400	33800	37900	6280	e17000	3540	2860
15	e1610	1980	e2350	e2000	e1900	e2370	36700	36900	5930	16400	3500	2840
16	e1620	1970	e2300	e2000	e1900	e2330	e39300	35400	5740	16300	3430	2860
17	e1630	1970	e2300	e2000	e1900	e2300	45100	33900	5560	16700	3350	2850
18	e1610	1930	e2300	e2000	e1900	e2300	48800	32400	5410	17200	3290	2800
19	e1600	1930	e2250	e2000	e1900	e2250	62000	30700	5290	17500	3260	2670
20	e1650	1870	e2250	e2000	e1900	e2200	82100	28900	5180	17100	3240	2650
21	e1700	e1900	e2200	e2000	e1900	e2200	102000	27000	5100	16200	3240	2740
22	e1720	e1940	e2200	e2000	e1850	e2200	115000	25300	5040	15100	3240	2810
23	e1750	e1970	e2150	e1950	e1800	e2200	121000	24500	5010	13500	3190	2810
24	e1800	e2000	e2150	e1950	e1800	e2200	124000	23800	5020	11700	3160	2750
25	1860	e2050	e2050	e1950	e1850	e2300	123000	23300	5220	9930	3120	2710
26	1920	e2100	e2000	e1950	e1900	e2400	114000	22500	e5400	8360	3080	2640
27	2120	e2200	e2000	e1950	e2000	e2400	103000	21700	e8000	7150	3020	2560
28	2140	e2300	e2000	e1950	e2100	e2400	91200	21000	e15000	6380	2970	2490
29	2230	e2400	e2000	e1950	---	e2400	81600	20100	e18000	5900	2920	2420
30	2290	e2500	e2000	e1900	---	e2500	76200	19000	e19000	5560	2880	2430
31	2310	---	e2000	e1900	---	e2700	---	17900	---	5270	2860	---
TOTAL	53800	69580	73240	61150	51900	73550	1641260	1162400	270610	464350	113260	81700
MEAN	1735	2319	2363	1973	1854	2373	54710	37500	9020	14980	3654	2723
MAX	2310	3140	2800	2000	2100	2700	124000	71400	19000	21300	5000	2870
MIN	1440	1870	2000	1900	1700	2200	3000	17900	5010	5270	2860	2420
AC-FT	106700	138000	145300	121300	102900	145900	3255000	2306000	536800	921000	224700	162100

e Estimated

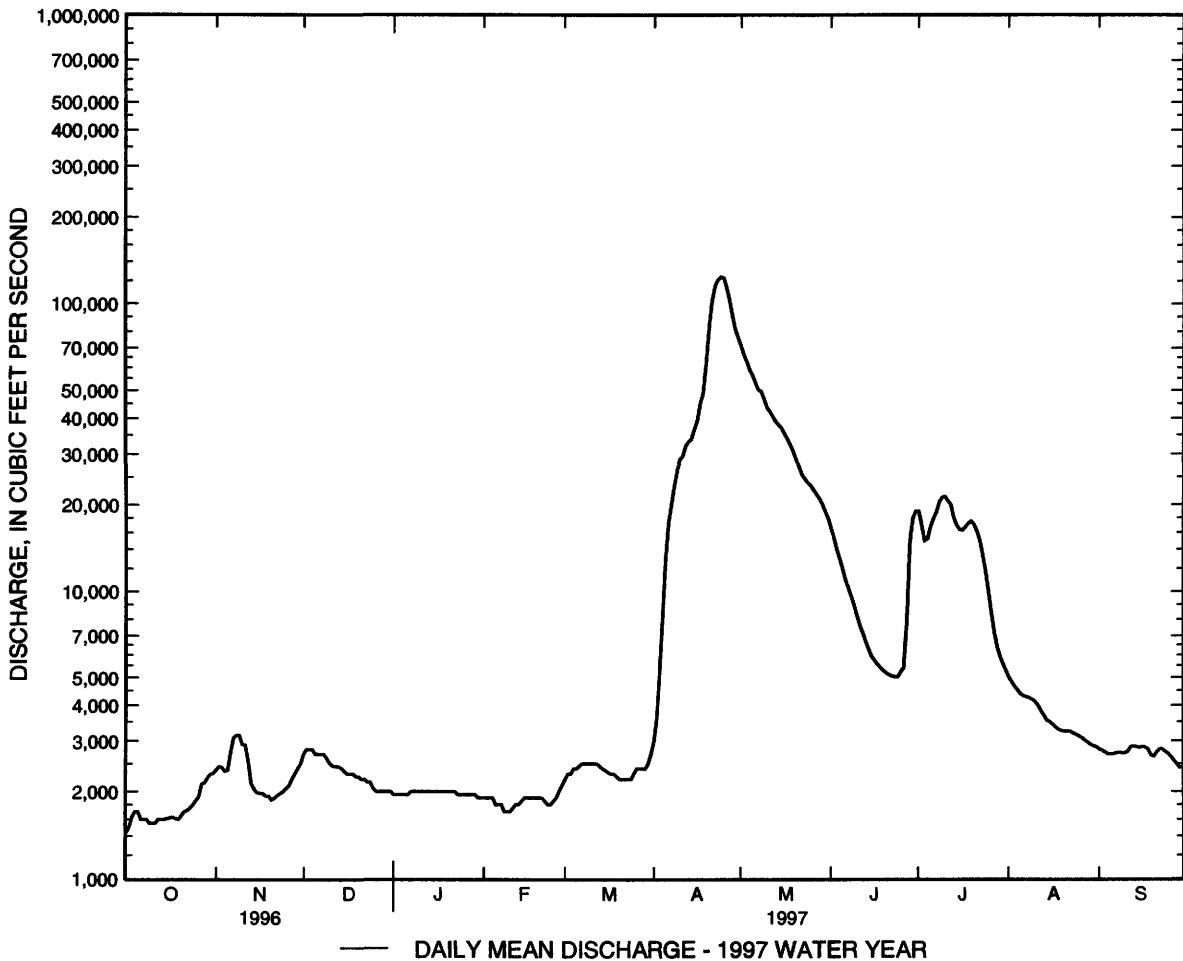
RED RIVER OF THE NORTH BASIN

05092000 RED RIVER OF THE NORTH AT DRAYTON, ND--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1949 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1839	1565	1253	1095	1065	2940	15010	9263	5386	4802	2456	1856
MAX	5194	5653	3072	2065	1978	15720	54710	58890	23420	28240	21580	7912
(WY)	1995	1972	1972	1966	1996	1995	1997	1950	1962	1975	1993	1993
MIN	317	277	149	174	201	280	1275	938	676	348	243	329
(WY)	1991	1977	1977	1990	1977	1962	1981	1977	1977	1988	1977	1988

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1949 - 1997	
ANNUAL TOTAL	2970330		4116800			
ANNUAL MEAN	8116		11280		4064	
HIGHEST ANNUAL MEAN					11280	
LOWEST ANNUAL MEAN					536	
HIGHEST DAILY MEAN	60500		124000		124000	
LOWEST DAILY MEAN	1420		1440		110	
ANNUAL SEVEN-DAY MINIMUM	1440		1580		118	
INSTANTANEOUS PEAK FLOW			124000		124000	
INSTANTANEOUS PEAK STAGE			45.55		45.55	
INSTANTANEOUS LOW FLOW					7.7	
ANNUAL RUNOFF (AC-FT)	5892000		8166000		2944000	
10 PERCENT EXCEEDS	27800		32200		8900	
50 PERCENT EXCEEDS	2390		2700		1780	
90 PERCENT EXCEEDS	1730		1850		472	



RED RIVER OF THE NORTH BASIN

05092000 RED RIVER OF THE NORTH AT DRAYTON, ND--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water year 1972 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)
OCT 15...	1425	1610	602	--	20.5	13.5	--	--	--	--
JAN 03...	1400	1950	579	--	-10.0	0.5	--	--	--	--
MAR 07...	1610	2500	672	--	-0.5	0.5	--	--	--	--
JUL 21...	1415	16100	--	--	26.0	21.5	--	--	--	--
SEP 18...	1630	2780	552	8.3	14.5	17.5	240	215	52	27
DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLID ^o , DIS- SOLVED ^o (TON ^o PER AC-FT) (70302)
SEP 18...	28	20	0.8	5.7	61	30	0.10	333	337	0.46
DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SF) (01080)
SEP 18...	2530	3	50	<1.0	30	10	<0.1	<1.0	<1	210

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RED RIVER OF THE NORTH BASIN

05094000 SOUTH BRANCH TWO RIVERS AT LAKE BRONSON, MN

LOCATION.--Lat 48°43'50", long 96°39'50", in SW 1/4 SW 1/4 sec. 30, T.161 N., R.46 W., Kittson County, Hydrologic Unit 09020312, on left bank 70 ft upstream from culvert on U.S. Highway 59 at Lake Bronson and 3.4 mi downstream from dam at outlet of Bronson Lake.

DRAINAGE AREA.--444 mi².

PERIOD OF RECORD.--September 1928 to November 1936, April to September 1937, April 1941 to October 1943, April to December 1944, April 1945 to September 1947, October 1953 to September 1981, April 1985 to current year. Monthly discharge only for some periods, published in WSP 1308. October 1981 to March 1985, annual maximums only. Published as South Fork Two Rivers at Bronson prior to 1941.

REVISED RECORDS.--WSP 1308: 1929(M), 1931(M), 1936(M), 1944(M), 1947(M).

GAGE.--Water-stage recorder. Datum of gage is 928.53 ft above mean sea level (Minnesota Department of Transportation bench mark). Prior to Nov. 23, 1953, nonrecording gage at bridge 100 ft downstream at datum 2.00 ft higher. Nov 23, 1953 to Oct. 5, 1963, water-stage recorder at same site at datum 2.00 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow partly regulated since 1937 at Bronson Lake; usable capacity, 3,700 acre-ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e6.0	4.1	5.1	.20	e.40	e11	e200	895	241	67	12	1.6
2	e3.2	4.5	4.8	.20	e1.4	e12	e500	750	206	201	1.9	1.4
3	e1.8	4.5	4.6	.20	e10	e12	191	599	182	495	.97	1.3
4	e1.4	5.1	4.5	.20	e11	e11	76	581	190	624	.95	1.2
5	e1.3	5.6	e6.0	.20	e11	e10	e130	487	197	615	1.2	1.2
6	e1.4	11	e20	.18	e10	e11	e450	545	199	503	1.6	1.1
7	e1.5	22	e30	.18	e10	e11	e350	543	197	421	2.0	1.5
8	e1.4	24	e22	.18	e11	e12	e300	548	175	335	2.3	24
9	e1.3	20	e10	.18	e10	e10	e290	821	157	230	2.5	14
10	e1.2	3.5	e4.0	.18	e10	e6.0	e290	773	129	176	2.5	2.2
11	e1.3	5.8	e2.2	.18	e9.5	e5.6	e340	689	62	175	2.7	1.1
12	e1.4	7.3	1.8	.18	e10	e5.8	e340	542	62	139	2.5	.79
13	e1.7	7.7	1.5	.18	e9.5	e6.0	e290	541	54	101	2.3	1.4
14	e1.9	7.7	1.2	.18	e9.5	e5.8	e290	529	28	113	2.4	1.1
15	e1.9	7.7	.93	.18	e9.4	e6.0	e320	494	4.7	143	3.1	.89
16	1.8	7.6	.79	.18	e9.0	e5.8	e500	375	4.6	155	113	17
17	1.8	8.1	.65	.18	e10	e5.6	e1000	462	5.3	152	2.7	34
18	1.7	12	.56	.18	e11	e5.4	e1600	454	6.0	119	1.0	21
19	1.3	11	.48	.16	e11	e5.6	3190	422	11	69	.93	22
20	1.3	9.7	.43	.16	e12	e5.4	4100	379	23	59	.98	22
21	1.3	8.9	.39	.16	e11	e4.9	4050	342	28	43	.82	21
22	1.3	7.9	.35	e.21	e11	e4.3	3890	334	25	23	.79	19
23	1.3	7.4	.31	e.23	e10	e3.5	3600	344	25	18	1.1	2.2
24	1.3	6.7	.28	e.22	e10	e2.5	3290	350	23	17	1.2	.55
25	1.3	6.4	.28	e.21	e9.6	e2.3	2820	347	22	18	1.7	.59
26	1.6	6.4	.28	e.20	e10	e2.5	2320	327	21	18	1.5	1.4
27	2.7	6.0	.24	e.18	e11	e2.7	1950	313	24	17	1.5	2.7
28	2.7	6.0	.22	e.18	e10	e2.8	1620	271	35	15	1.7	5.6
29	2.9	5.6	.22	e.18	---	e3.0	1280	242	39	15	1.7	5.7
30	3.0	5.2	.21	e.22	---	e3.5	992	244	44	15	1.7	5.2
31	4.0	---	.20	e.27	---	e4.0	---	243	---	14	1.6	---
TOTAL	60.0	255.4	124.52	5.92	268.30	199.0	40559	14786	2419.6	5105	174.84	234.72
MEAN	1.94	8.51	4.02	.19	9.58	6.42	1352	477	80.7	165	5.64	7.82
MAX	6.0	24	30	.27	12	12	4100	895	241	624	113	34
MIN	1.2	3.5	.20	.16	.40	2.3	76	242	4.6	14	.79	.55
AC-FT	119	507	247	12	532	395	80450	29330	4800	10130	347	466
CFSM	.00	.02	.01	.00	.02	.01	3.04	1.07	.18	.37	.01	.02
IN.	.01	.02	.01	.00	.02	.02	3.40	1.24	.20	.43	.01	.02

e Estimated

RED RIVER OF THE NORTH BASIN

05094000 SOUTH BRANCH TWO RIVERS AT LAKE BRONSON, MN--Continued

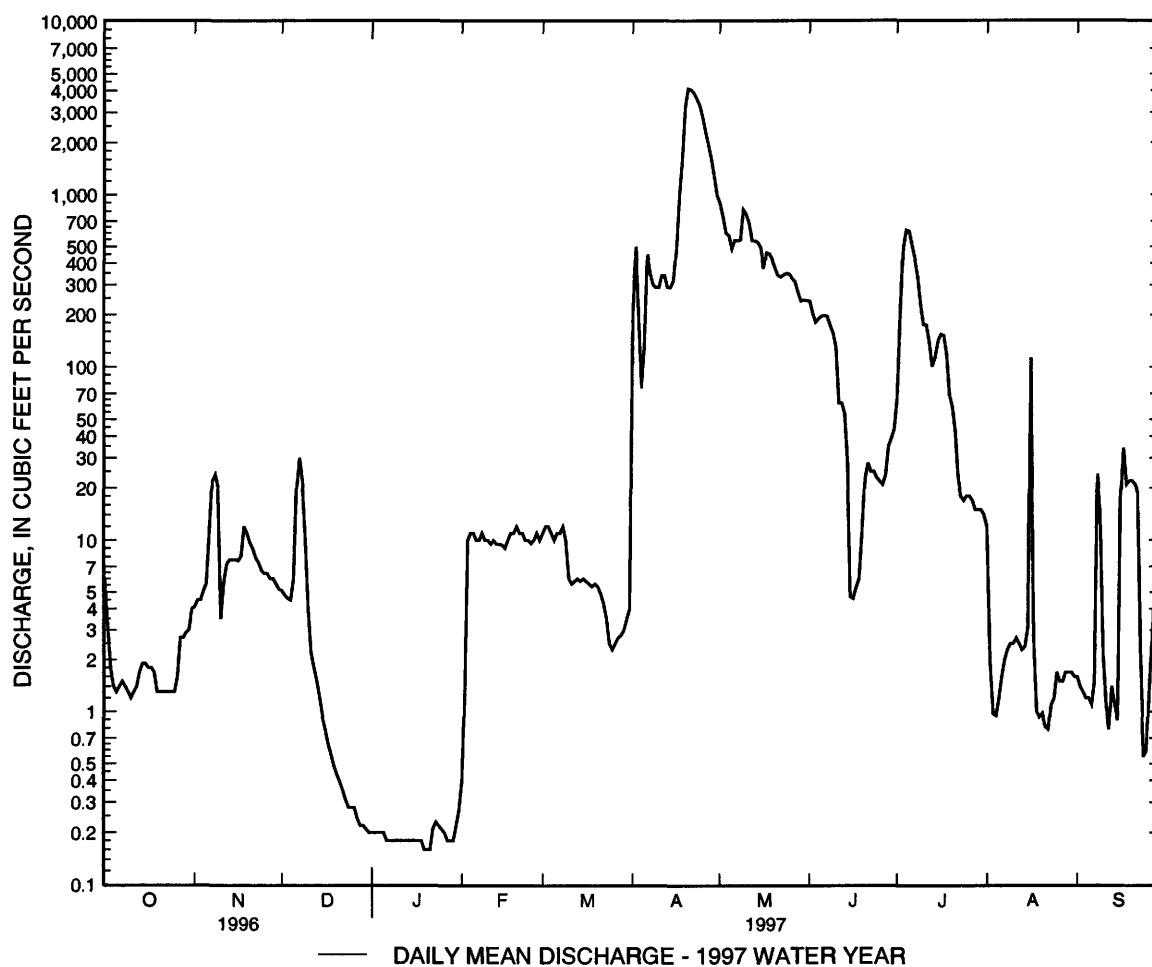
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	19.5	13.0	4.83	2.90	3.42	69.9	428	219	161	110	48.6	44.3
MAX	153	97.0	34.5	12.1	23.6	689	1977	1500	1336	1136	1349	525
(WY)	1958	1995	1992	1992	1981	1995	1966	1996	1970	1956	1993	1957
MIN	.40	.38	.13	.12	.12	.66	.54	.98	1.43	.44	.089	.000
(WY)	1991	1990	1987	1987	1987	1934	1991	1991	1980	1988	1988	1937

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1929 - 1997
ANNUAL TOTAL	106028.32	64192.30	
ANNUAL MEAN	290	176	94.3 ^a
HIGHEST ANNUAL MEAN			312
LOWEST ANNUAL MEAN			2.89
HIGHEST DAILY MEAN	4150	4100	5290
LOWEST DAILY MEAN	.20	.16	.00 ^b
ANNUAL SEVEN-DAY MINIMUM	.24	.17	.00
INSTANTANEOUS PEAK FLOW		4260	5410
INSTANTANEOUS PEAK STAGE		14.58	18.23
ANNUAL RUNOFF (AC-FT)	210300	127300	68340
ANNUAL RUNOFF (CFSM)	.65	.40	.21
ANNUAL RUNOFF (INCHES)	8.88	5.38	2.89
10 PERCENT EXCEEDS	662	457	225
50 PERCENT EXCEEDS	15	7.4	4.8
90 PERCENT EXCEEDS	1.7	.28	.80

a Median of annual mean discharges is 58 ft³/s.

b Many days, several years.



RED RIVER OF THE NORTH BASIN

05102500 RED RIVER OF THE NORTH AT EMERSON, MANITOBA

(International Gaging Station)

LOCATION.--Lat 49°00'30", long 97°12'40", in sec. 2, T.1, R.2 E., Hydrologic Unit 09020311, on right bank 1,500 ft downstream from Canadian National Railway bridge in Emerson, 0.8 mi downstream from international boundary, 3.6 mi downstream from Pembina River, and at mile 154.3.

DRAINAGE AREA.--40,200 mi², approximately, includes 3,800 mi² in closed basins.

PERIOD OF RECORD.--March to November 1902 (gage heights only), May 1912 to September 1929 (monthly discharge only, published in WSP 1308), October 1929 to current year.

GAGE.--Water-stage recorder. Datum of gage is Geodetic Survey of Canada Datum of 1929. See WSP 1728 or 1913 for history of changes prior to Apr. 10, 1953.

COOPERATION.--This station is one of the international gaging stations maintained by Canada under agreement with the United States. Records provided by Water Survey of Canada.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

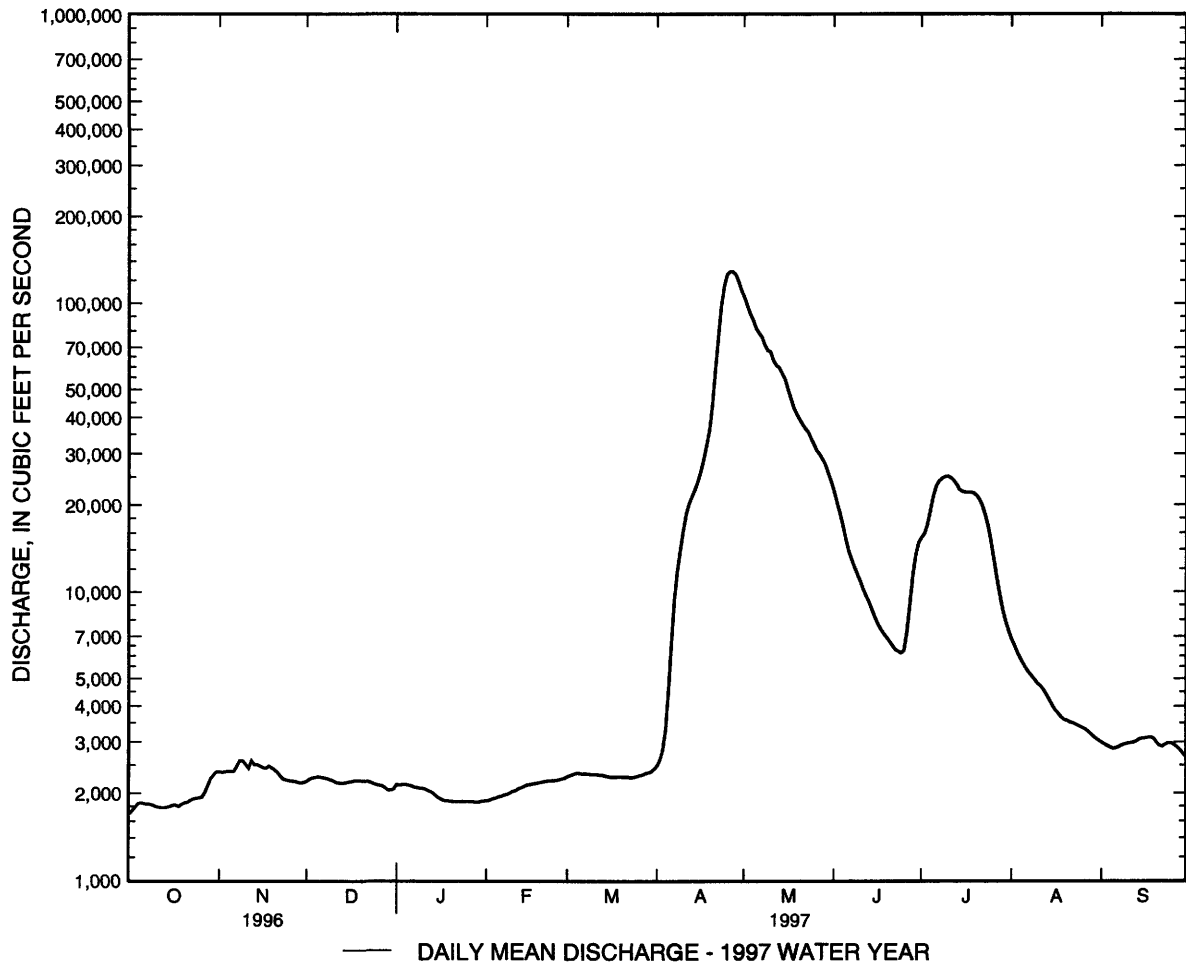
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1700	e2370	e2200	e2140	e1880	e2280	e2490	105000	22200	15400	6850	2990
2	1740	e2360	e2240	e2130	e1890	e2300	e2610	98200	20300	15900	6500	2950
3	1790	e2370	e2260	e2140	e1910	e2320	e2830	91800	18700	17100	6140	2910
4	1840	e2380	e2270	e2140	e1920	e2340	e3330	87200	17000	19100	5860	2880
5	1850	e2380	e2280	e2130	e1940	e2340	e4590	81600	15300	21400	5620	2850
6	1840	e2380	e2270	e2120	e1950	e2330	e6780	78800	13900	23300	5400	2860
7	1830	e2480	e2260	e2100	e1970	e2330	e9500	76300	13000	24200	5230	2890
8	1830	e2590	e2250	e2090	e1980	e2330	e11900	71700	12200	24700	5090	2930
9	1820	e2590	e2230	e2080	e2000	e2320	e14000	68500	11500	25000	4940	2950
10	1800	e2520	e2210	e2080	e2030	e2320	e16300	67800	10900	25100	4800	2970
11	1790	e2440	e2180	e2060	e2040	e2320	e18600	63200	10200	24800	4700	2980
12	1780	e2590	e2170	e2040	e2070	e2310	e20200	60700	9680	24300	4560	2990
13	1780	e2510	e2170	e2020	e2090	e2310	e21400	59700	9220	23500	4380	3020
14	1790	e2510	e2170	e1980	e2110	e2290	e22600	56900	8690	22600	4200	3070
15	1800	e2480	e2180	e1940	e2130	e2280	e24200	54400	8190	22200	4030	3090
16	1820	e2450	e2190	e1910	e2140	e2270	e26200	50100	7770	22100	3880	3100
17	1820	e2440	e2200	e1890	e2150	e2270	e28900	46600	7450	22100	3780	3110
18	1800	e2480	e2210	e1880	e2160	e2270	e32200	43400	7170	22100	3670	3120
19	1830	e2450	e2210	e1880	e2170	e2270	e36400	41300	6960	21900	3600	3090
20	1850	e2410	e2200	e1870	e2180	e2270	e44800	39600	6750	21500	3570	2990
21	1860	e2360	e2200	e1870	e2190	e2270	59000	38100	6530	20800	3520	2920
22	1890	e2290	e2200	e1870	e2200	e2270	76600	36700	6320	19700	3500	2900
23	1910	e2240	e2180	e1870	e2200	e2260	97800	35700	6220	18300	3460	2940
24	1920	e2220	e2160	e1870	e2210	e2270	115000	34000	6140	16600	3420	2980
25	1930	e2210	e2140	e1870	e2210	e2280	126000	32400	6250	14600	3380	2980
26	1940	e2200	e2130	e1870	e2220	e2300	129000	30800	7200	12700	3340	2940
27	2020	e2200	e2120	e1870	e2240	e2310	129000	29900	9080	11000	3290	2890
28	2130	e2180	e2090	e1860	e2250	e2340	126000	28800	11400	9680	3220	2830
29	2250	e2170	e2050	e1860	---	e2350	119000	27500	13400	8620	3150	2750
30	2310	e2180	e2050	e1870	---	e2370	111000	25800	14800	7880	3090	2680
31	2370	---	e2070	e1880	---	e2420	---	24000	---	7310	3040	---
TOTAL	58630	71430	67740	61180	58430	71510	1438230	1686500	324420	585490	133210	88550
MEAN	1891	2381	2185	1974	2087	2307	47940	54400	10810	18890	4297	2952
MAX	2370	2590	2280	2140	2250	2420	129000	105000	22200	25100	6850	3120
MIN	1700	2170	2050	1860	1880	2260	2490	24000	6140	7310	3040	2680
AC-FT	116300	141700	134400	121400	115900	141800	2853000	3345000	643500	1161000	264200	175600

e Estimated

RED RIVER OF THE NORTH BASIN

05102500 RED RIVER OF THE NORTH AT EMERSON, MANITOBA--Continued



RED RIVER OF THE NORTH BASIN

05104500 ROSEAU RIVER BELOW SOUTH FORK NEAR MALUNG, MN

LOCATION.--Lat 48°47'30", long 95°44'40", in NW¼SW¼ sec. 6, T.161 N., R.39 W., Roseau County, Hydrologic Unit 09020314, on left bank 0.3 mi downstream from South Fork and 1.5 mi northwest of Malung.

DRAINAGE AREA.--573 mi².

PERIOD OF RECORD.--October 1946 to current year.

REVISED RECORDS.--WSP 2113:1948, 1950, 1951, 1956(M), 1957(M), 1962(M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,029.67 ft, adjustment of 1912.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Some flow bypasses the gaging station through a natural overflow channel 0.8 mi upstream and returns to river 0.5 mi downstream. Overflow begins at stage of about 13.0 ft, discharge, 1,800 ft³/s.

These records include any flow in the overflow channel.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	e55	e39	e27	e20	20	e25	858	127	106	48	3.9
2	13	e51	e39	e27	e20	20	e28	751	123	142	41	3.8
3	12	e48	38	e27	e20	19	e90	664	128	280	34	3.7
4	9.8	e44	38	e27	e20	19	e250	593	157	481	29	3.1
5	8.9	e42	38	e26	e20	19	e1500	540	199	514	25	3.2
6	7.7	e47	39	e26	e20	19	e2500	482	207	481	22	2.9
7	7.7	e49	39	e26	e20	19	e2200	443	172	398	20	3.1
8	13	e51	38	e25	e20	19	e1900	584	142	297	18	3.6
9	22	e50	38	e25	e20	19	e1600	800	118	233	15	3.1
10	15	e50	38	e24	e20	19	e1400	866	87	191	14	2.9
11	9.9	e49	38	e24	e20	19	e1200	826	74	159	12	3.6
12	9.5	e49	37	e23	e20	18	e1050	753	62	134	10	4.3
13	8.7	e48	e37	22	e20	17	e950	648	50	119	9.7	3.9
14	8.0	e48	e37	e22	e20	17	e1200	565	44	108	8.3	3.2
15	7.7	e47	e36	e21	e20	15	e1700	516	39	98	8.0	2.3
16	7.5	e46	e36	e20	e20	13	e2400	490	34	87	9.8	2.6
17	7.8	e45	e36	19	e20	13	e3000	461	32	79	9.7	3.0
18	11	e45	e35	18	e20	16	e4000	409	31	68	9.1	2.9
19	20	e44	e35	e19	e20	17	e4300	355	29	59	8.3	3.1
20	22	e44	e34	e20	e20	18	4150	312	27	51	7.9	3.6
21	38	e43	e33	e20	e20	19	3910	277	26	44	6.8	3.7
22	36	e43	e31	e20	e20	19	3540	255	22	38	6.8	3.6
23	e35	e42	e29	e20	20	19	3050	250	19	34	7.7	6.5
24	e33	e42	27	e20	17	19	2550	251	21	30	5.2	8.3
25	e30	e42	27	e20	17	20	2080	245	28	27	5.8	8.2
26	e29	e41	27	e20	19	20	1700	234	30	38	5.8	10
27	e27	e41	27	20	19	20	1410	208	35	39	5.9	15
28	e36	e40	27	20	20	21	1180	187	54	55	5.5	25
29	e46	e40	27	20	---	e22	1050	170	95	64	5.0	30
30	e52	e39	e27	e20	---	e24	972	154	101	62	4.4	27
31	e58	---	e27	e20	---	e24	---	138	---	55	3.8	---
TOTAL	651.2	1365	1054	688	552	582	56885	14285	2313	4571	421.5	203.1
MEAN	21.0	45.5	34.0	22.2	19.7	18.8	1896	461	77.1	147	13.6	6.77
MAX	58	55	39	27	20	24	4300	866	207	514	48	30
MIN	7.5	39	27	18	17	13	25	138	19	27	3.8	2.3
AC-FT	1290	2710	2090	1360	1090	1150	112800	28330	4590	9070	836	403
CFSM	.04	.08	.06	.04	.03	.03	3.31	.80	.13	.26	.02	.01
IN.	.04	.09	.07	.04	.04	.04	3.69	.93	.15	.30	.02	.01

e Estimated

RED RIVER OF THE NORTH BASIN

05104500 ROSEAU RIVER BELOW SOUTH FORK NEAR MALUNG, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 1997, BY WATER YEAR (WY)

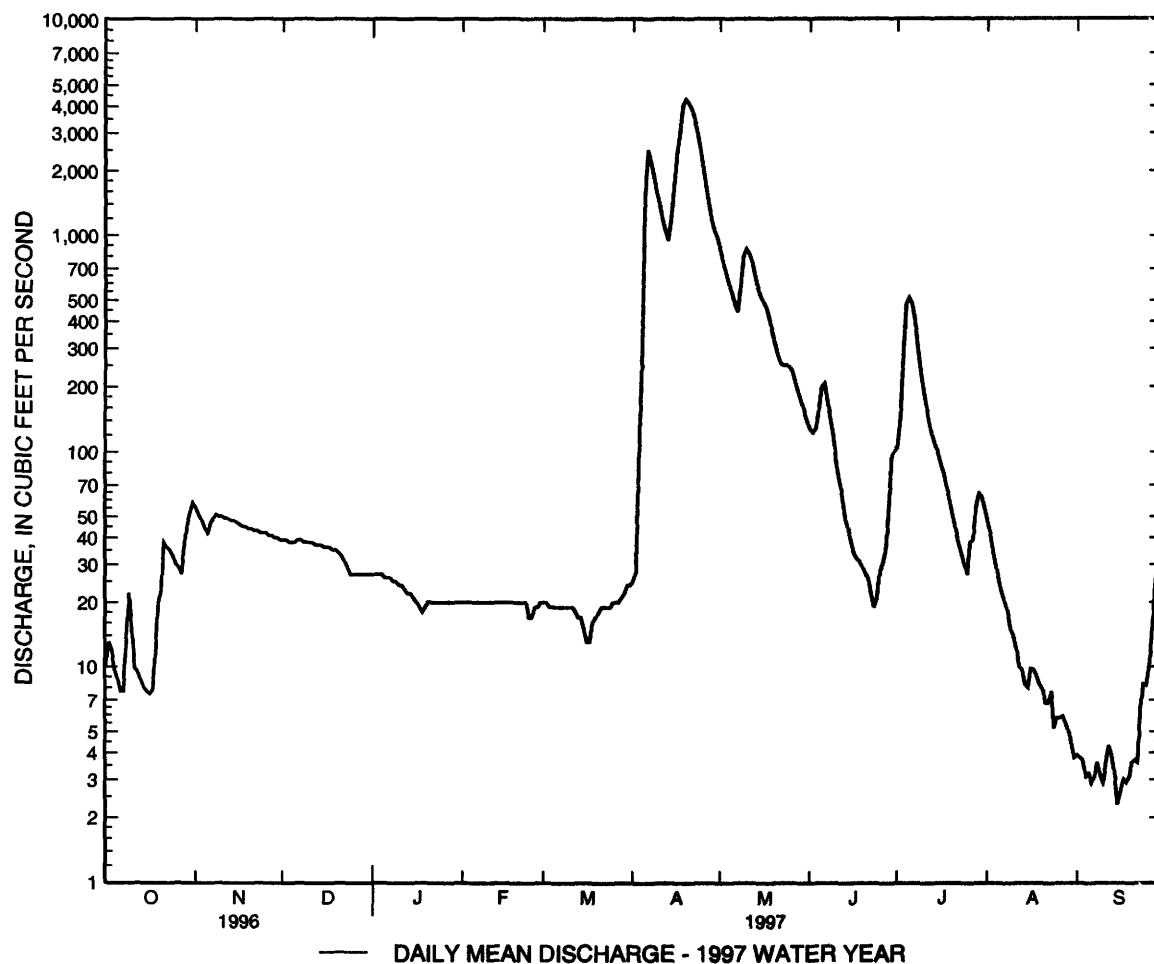
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	66.9	50.1	15.9	7.61	5.73	63.4	609	322	214	160	62.5	81.0
MAX	351	362	65.6	22.2	19.7	525	2035	1589	1140	1152	585	710
(WY)	1983	1995	1995	1997	1997	1995	1966	1950	1968	1968	1968	1957
MIN	.029	.16	.013	.000	.000	.83	5.60	8.77	4.16	.092	.000	.025
(WY)	1991	1991	1977	1977	1977	1977	1991	1990	1980	1980	1961	1988

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1947 - 1997
ANNUAL TOTAL	95899.7	83570.8	
ANNUAL MEAN	262	229	138 ^a
HIGHEST ANNUAL MEAN			304
LOWEST ANNUAL MEAN			7.28
HIGHEST DAILY MEAN	6970	4300	6970
LOWEST DAILY MEAN	3.8	2.3	.00 ^b
ANNUAL SEVEN-DAY MINIMUM	4.3	3.0	.00
INSTANTANEOUS PEAK FLOW			7310
INSTANTANEOUS PEAK STAGE		22.98 ^c	23.45 ^c
INSTANTANEOUS LOW FLOW		2.0	
ANNUAL RUNOFF (AC-FT)	190200	165800	100100
ANNUAL RUNOFF (CFSM)	.46	.40	.24
ANNUAL RUNOFF (INCHES)	6.23	5.43	3.27
10 PERCENT EXCEEDS	633	573	316
50 PERCENT EXCEEDS	33	28	18
90 PERCENT EXCEEDS	9.1	7.7	1.6

a Median of annual mean discharges is 114 ft³/s.

b Many days, several years.

c From highwater mark, backwater from ice.



RED RIVER OF THE NORTH BASIN
05107500 ROSEAU RIVER AT ROSS, MN

LOCATION.--Lat 48°54'37", long 95°55'18", in NE 1/4 SE 1/4 sec. 27, T. 163 N., R. 41 W., Roseau County, Hydrologic Unit 090203014, on left bank 300 ft downstream from highway bridge, 0.2 mi. north of Ross, and 2.3 mi downstream from Pine Creek.

DRAINAGE AREA.--1,220 mi², approximately.

PERIOD OF RECORD.--July 1928 to September 1991, April 1995 to current year.

REVISED RECORDS.--WSP 1055: 1945. WSP 1175: Drainage area. WSP 1308: 1936(m). WSP 1508: 1848-49(P).

GAGE.--Water-stage recorder. Datum of gage is 1,018.61 ft above National Geodetic Vertical Datum of 1929 (levels by Geodetic Survey of Canada). Prior to Mar. 13, 1929, nonrecording gage at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor.. High flow affected by natural storage in Roseau Lake.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known, about 19 ft in 1896. Other outstanding floods reached the following stages, from information by local residents: flood of July 1919, 17.5 ft; flood of 1927, about 16 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	70	e142	e97	e75	e56	e44	e50	3950	1300	216	188	17
2	63	e136	e96	e75	e55	e44	e56	3780	1230	324	145	14
3	61	e130	e94	e74	e55	e44	e70	3590	1190	612	114	12
4	59	e125	e93	e74	e54	e44	e120	3420	1160	768	90	11
5	52	e127	e92	e73	e54	e44	e200	3270	1130	806	75	9.9
6	48	e132	e91	e73	e53	e44	e400	3160	1100	794	67	9.3
7	44	e138	e90	e72	e53	e44	e1200	3060	1050	772	60	9.4
8	43	e140	e90	e72	e52	e44	e1150	2930	1000	759	53	28
9	44	e140	e89	e71	e52	e44	e1100	2900	940	725	46	35
10	52	e135	e89	e71	e51	e43	e1000	2860	874	676	41	26
11	51	e128	e88	e70	e51	e43	e900	2770	800	612	36	19
12	48	e125	e88	e69	e51	e43	e850	2750	720	541	31	18
13	44	e123	e87	e69	e50	e43	e820	2710	635	486	28	22
14	41	e122	e86	e69	e50	e43	e1000	2620	539	448	26	26
15	39	e121	e86	e69	e50	e43	e1360	2550	447	407	24	21
16	38	e120	e85	e68	e49	e43	e1560	2490	378	356	31	25
17	37	e119	e84	e67	e49	e43	e1800	2440	330	300	44	54
18	47	e118	e84	e66	e49	e43	e2100	2380	291	242	52	58
19	74	e117	e83	e65	e48	e43	e2600	2300	229	192	50	49
20	92	e116	e82	e64	e48	e43	3030	2240	197	157	43	42
21	93	e114	e82	e63	e48	e43	3450	2170	175	132	38	36
22	101	e112	e81	e62	e47	e43	3880	2110	151	108	34	31
23	e105	e110	e80	e62	e47	e43	4260	2040	137	90	32	27
24	e104	e108	e80	e61	e47	e43	4500	1980	138	77	32	23
25	e100	e106	e80	e60	e46	e43	4600	1910	162	67	32	19
26	e98	e105	e79	e60	e46	e43	4600	1830	168	301	34	15
27	e99	e103	e79	e59	e45	e43	4560	1740	157	572	32	17
28	e110	e101	e78	e58	e45	e43	4430	1650	163	520	25	21
29	e130	e99	e78	e58	---	e43	4180	1560	168	433	23	31
30	e145	e98	e77	e57	---	e44	4130	1470	206	335	23	34
31	e148	---	e76	e57	---	e45	---	1380	---	252	20	---
TOTAL	2280	3610	2644	2063	1401	1345	63956	78010	17165	13080	1569	759.6
MEAN	73.5	120	85.3	66.5	50.0	43.4	2132	2516	572	422	50.6	25.3
MAX	148	142	97	75	56	45	4600	3950	1300	806	188	58
MIN	37	98	76	57	45	43	50	1380	137	67	20	9.3
AC-FT	4520	7160	5240	4090	2780	2670	126900	154700	34050	25940	3110	1510
CFSM	.06	.10	.07	.05	.04	.04	1.75	2.06	.47	.35	.64	.02
IN.	.07	.11	.08	.06	.04	.04	1.95	2.38	.52	.40	.65	.02

e Estimated

RED RIVER OF THE NORTH BASIN

05107500 ROSEAU RIVER AT ROSS, MN--Continued

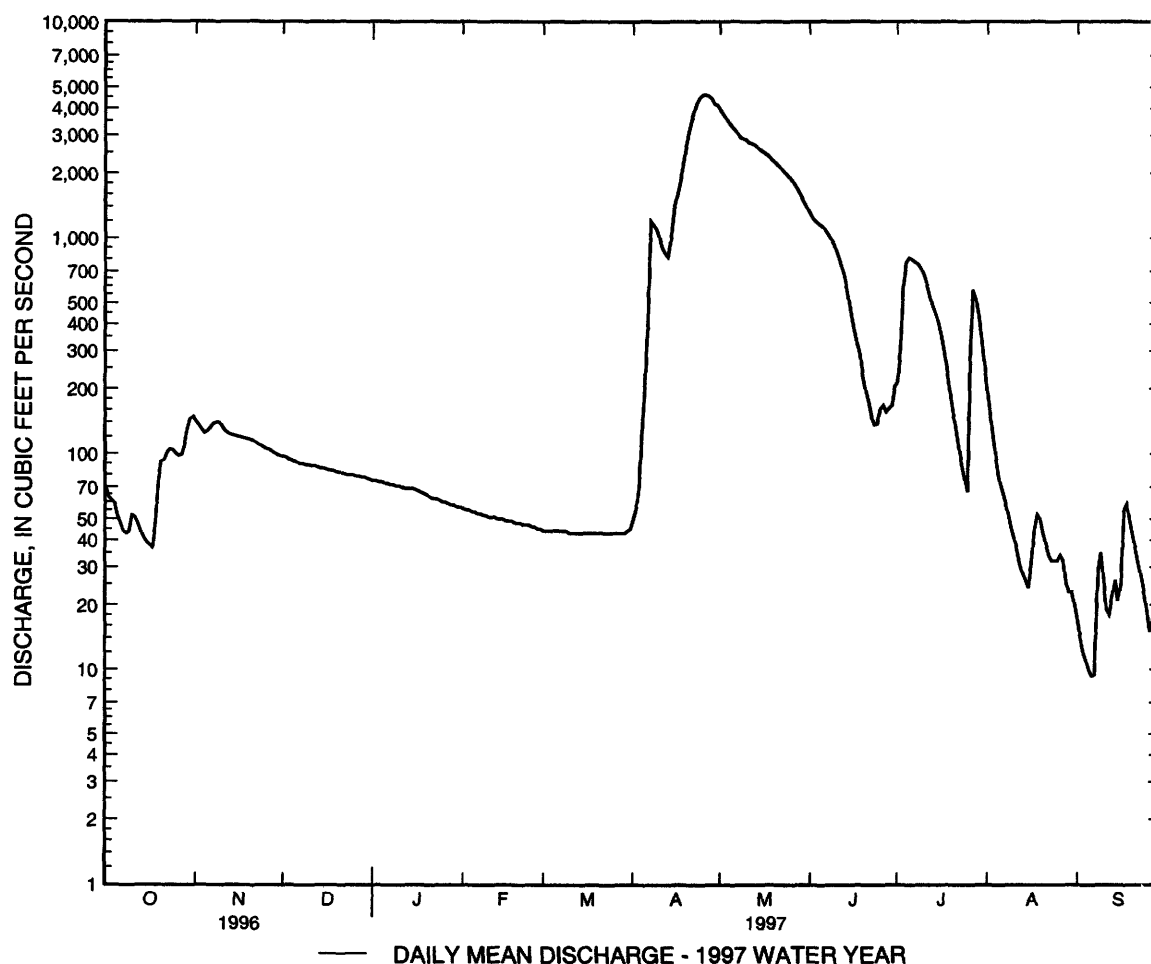
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1928 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	131	92.0	30.5	15.7	12.2	77.2	868	916	484	289	123	130
MAX	974	513	107	66.5	50.0	551	3234	4583	2258	1494	1352	1041
(WY)	1942	1957	1978	1997	1997	1946	1966	1950	1970	1968	1968	1968
MIN	1.91	1.63	.27	.001	.000	2.76	32.1	29.5	6.83	1.39	.84	.38
(WY)	1991	1977	1977	1977	1977	1989	1991	1988	1980	1980	1961	1990

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1928 - 1997
ANNUAL TOTAL	221275.7	187882.6	
ANNUAL MEAN	605	515	265 ^a
HIGHEST ANNUAL MEAN			725
LOWEST ANNUAL MEAN			28.9
HIGHEST DAILY MEAN	4490	May 24	4600
LOWEST DAILY MEAN	7.1	Sep 25	9.3
ANNUAL SEVEN-DAY MINIMUM	9.0	Sep 21	12
INSTANTANEOUS PEAK FLOW		4670	Apr 26
INSTANTANEOUS PEAK STAGE		17.30	Apr 26
INSTANTANEOUS LOW FLOW		7.5	Sep 7
ANNUAL RUNOFF (AC-FT)	438900	372700	191700
ANNUAL RUNOFF (CFSM)	.50	.42	.22
ANNUAL RUNOFF (INCHES)	6.75	5.73	2.95
10 PERCENT EXCEEDS	2680	2000	846
50 PERCENT EXCEEDS	85	82	38
90 PERCENT EXCEEDS	27	33	5.8

a Median of annual mean discharges is 231 ft³/s.

b Many days in 1961.



RED RIVER OF THE NORTH BASIN

05112000 ROSEAU RIVER BELOW STATE DITCH 51, NEAR CARIBOU, MN
(International Gaging Station)

LOCATION.--Lat 48°58'54", long 96°27'46", in SE 1/4 SW 1/4 sec. 34, T.164 N., R.45 W., Kittson County, Hydrologic Unit 09020314, on left bank 400 ft downstream from State ditch 51 (known locally as Caribou cutoff ditch) and 0.6 mi west of Caribou.

DRAINAGE AREA.--1,560 mi².

PERIOD OF RECORD.--April to October 1917, April 1920 to current year (no winter records in water years 1931, 1932, 1934-36, 1938-40, 1944-72). Published as "at Caribou," prior to April 1929; as "below Cutoff ditch, near Caribou" April 1929 to September 1936. Records published for both sites April 1929 to September 1930. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1938(M). WSP 1508: 1917(M), 1920, 1932(M), 1934-35(M). WSP 1913: 1954(M).

GAGE.--Water-stage recorder. Datum of gage is 1,002.31 ft above sea level (levels by Geodetic Survey of Canada). Prior to Apr. 1, 1929, recording gage at site at Caribou 0.6 mi upstream at datum 0.95 ft lower.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Satellite telemeter at station. Occasionally, at high stages, there is some natural diversion of flow above station to headwaters of Two Rivers.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of 1916 is reported to have reached a stage of about 15.5 ft at former site.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	92	e600	e108	e88	e83	e67	e90	3200	2260	271	348	23
2	95	e780	e106	e88	e83	e66	e130	3240	2210	702	231	21
3	92	726	e104	e87	e82	e66	e230	3260	2180	1070	160	19
4	80	357	e104	e87	e82	e66	e325	3260	2120	1150	118	18
5	73	265	e102	e87	e81	e65	e450	3260	2050	1140	91	18
6	59	275	e100	e88	e80	e65	e600	3240	1980	1130	76	17
7	55	307	e100	e90	e80	e64	e800	3250	1910	1120	67	19
8	49	395	e100	e94	e80	e64	e900	3310	1840	1130	60	32
9	44	497	e99	e98	e79	e64	e950	3290	1760	1120	54	29
10	42	591	e99	e100	e79	e64	e980	3250	1680	1100	48	40
11	45	533	e99	e100	e78	e63	e1000	3190	1610	1060	43	56
12	52	e500	e98	e99	e78	e63	e1050	3100	1520	1010	39	40
13	49	e600	e98	e95	e77	e63	e1100	3050	1430	973	35	32
14	44	e620	e98	e91	e76	e63	e1200	3030	1340	927	32	29
15	42	e600	e97	e88	e75	e64	e1300	3000	1230	865	30	33
16	35	e580	e97	e86	e74	e64	e1500	2980	1110	798	38	44
17	37	e400	e96	e84	e74	e66	e1700	2950	990	732	37	46
18	35	e350	e95	e84	e73	e68	e2000	2920	840	628	39	55
19	45	e380	e95	e84	e73	e70	e2200	2880	651	528	49	73
20	61	e400	e94	e84	e72	e69	e2300	2820	597	448	52	72
21	82	e410	e93	e84	e71	e62	2430	2780	493	388	46	63
22	90	e390	e93	e84	e70	e70	2510	2750	403	318	40	57
23	94	e360	e92	e84	e70	e80	2620	2730	349	274	36	54
24	105	e300	e92	e84	e69	e100	2710	2690	340	247	32	50
25	179	e230	e91	e84	e69	e115	2790	2640	355	225	31	50
26	199	e165	e91	e83	e68	e120	2870	2590	361	203	30	50
27	216	e140	e90	e83	e68	e115	2940	2530	332	388	30	52
28	254	e130	e90	e83	e67	e110	3010	2480	262	600	31	52
29	307	e120	e90	e83	---	e105	3090	2420	225	644	28	59
30	328	e110	e89	e83	---	e100	3140	2370	219	597	25	63
31	e400	---	e89	e83	---	e95	---	2310	---	505	22	---
TOTAL	3380	12111	2989	2720	2111	2376	48915	90770	34647	22291	1998	1266
MEAN	109	404	96.4	87.7	75.4	76.6	1631	2928	1155	719	64.5	42.2
MAX	400	780	108	100	83	120	3140	3310	2260	1150	348	73
MIN	35	110	89	83	67	62	90	2310	219	203	22	17
AC-FT	6700	24020	5930	5400	4190	4710	97020	180000	68720	44210	3960	2510
CFSM	.07	.26	.06	.06	.05	.05	1.05	1.88	.74	.46	.0*	.03
IN.	.08	.29	.07	.06	.05	.06	1.17	2.16	.83	.53	.0*	.03

e Estimated

RED RIVER OF THE NORTH BASIN

05112000 ROSEAU RIVER BELOW STATE DITCH 51, NEAR CARIBOU, MN--Continued

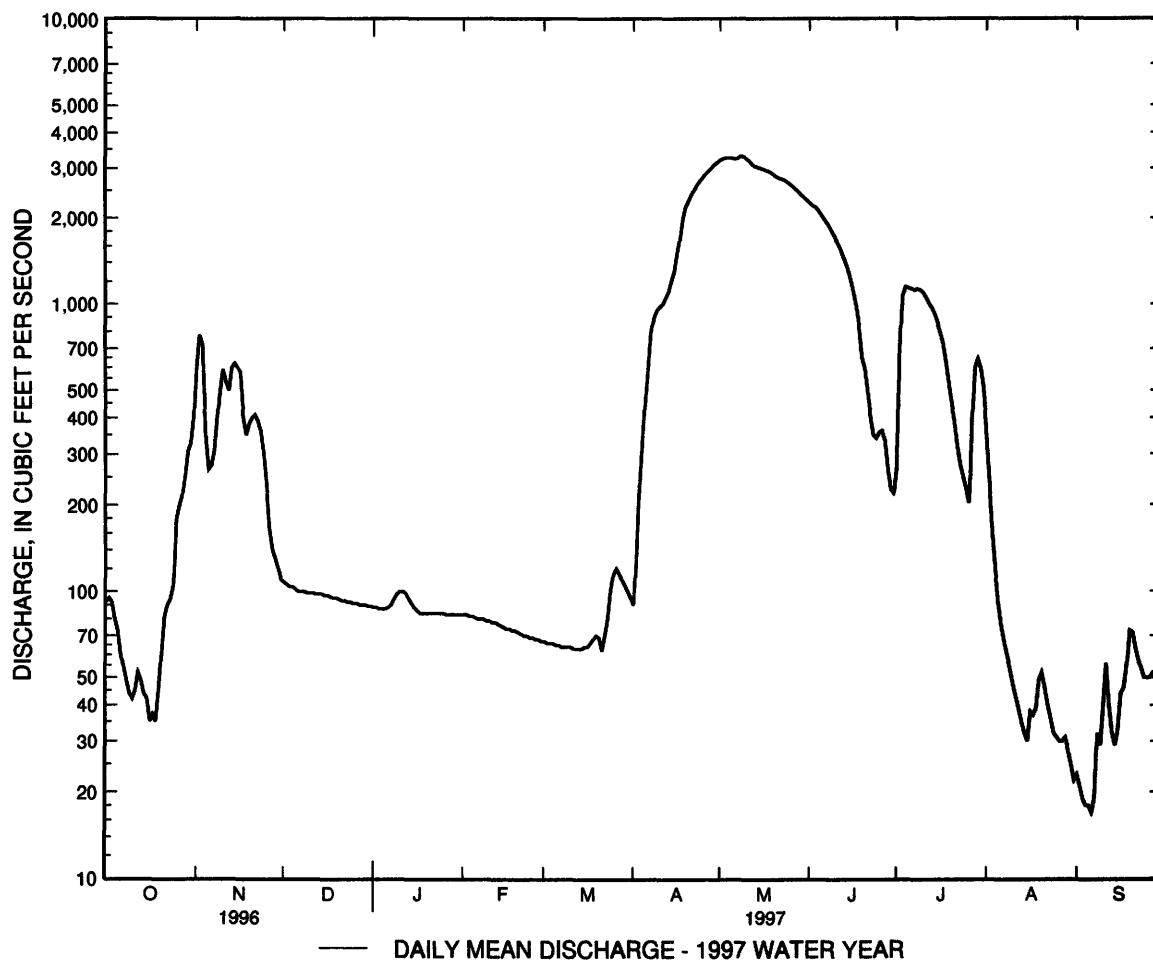
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1917 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	168	132	52.7	26.6	21.0	116	813	956	591	401	160	178
MAX	1302	712	303	134	75.4	793	2168	3029	2588	1653	1582	1451
(WY)	1942	1995	1995	1927	1997	1995	1966	1950	1970	1968	1993	1968
MIN	.12	.26	.53	.090	.060	1.57	38.2	26.9	6.70	.65	2.09	.30
(WY)	1991	1991	1991	1991	1991	1989	1981	1988	1980	1980	1936	1990

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1917 - 1997	
ANNUAL TOTAL	240129		225574			
ANNUAL MEAN	656		618		306	
HIGHEST ANNUAL MEAN					683	
LOWEST ANNUAL MEAN					35.9	
HIGHEST DAILY MEAN	3320	May 18	3310	May 8	4020	May 19 1950
LOWEST DAILY MEAN	22	Sep 13	17	Sep 6	.00	Sep 15 1950
ANNUAL SEVEN-DAY MINIMUM	23	Sep 11	19	Sep 1	.04	Sep 12 1950
INSTANTANEOUS PEAK FLOW			3320	May 8	4080	May 19 1950
INSTANTANEOUS PEAK STAGE			11.13 ^a	Apr 19	11.81	May 19 1950
INSTANTANEOUS LOW FLOW			17	Sep 4	.00 ^b	Aug 13 1956
ANNUAL RUNOFF (AC-FT)	476300		447400		222000	
ANNUAL RUNOFF (CFSM)	.42		.40		.20	
ANNUAL RUNOFF (INCHES)	5.73		5.38		2.67	
10 PERCENT EXCEEDS	2760		2490		1210	
50 PERCENT EXCEEDS	95		99		78	
90 PERCENT EXCEEDS	27		43		9.0	

a Backwater from ice.

b Many days, several years.



LAKE OF THE WOODS BASIN

05124480 KAWISHIWI RIVER NEAR ELY, MN

LOCATION.--Lat 47°55'22", long 91°32'06", in SE 1/4 SE 1/4 sec. 24, T.63 N., R.10 W., Lake County, Hydrologic Unit 09030001, in Superior National Forest, on left bank upstream from rapids, 2 mi upstream from South Kawishiwi River, 2.2 mi southwest of Fernberg Lookout Tower and 14 mi east of Ely.

DRAINAGE AREA.--253 mi².

PERIOD OF RECORD.--June 1966 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,450 ft above sea level, from topographic map.

REMARKS.--Records good.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

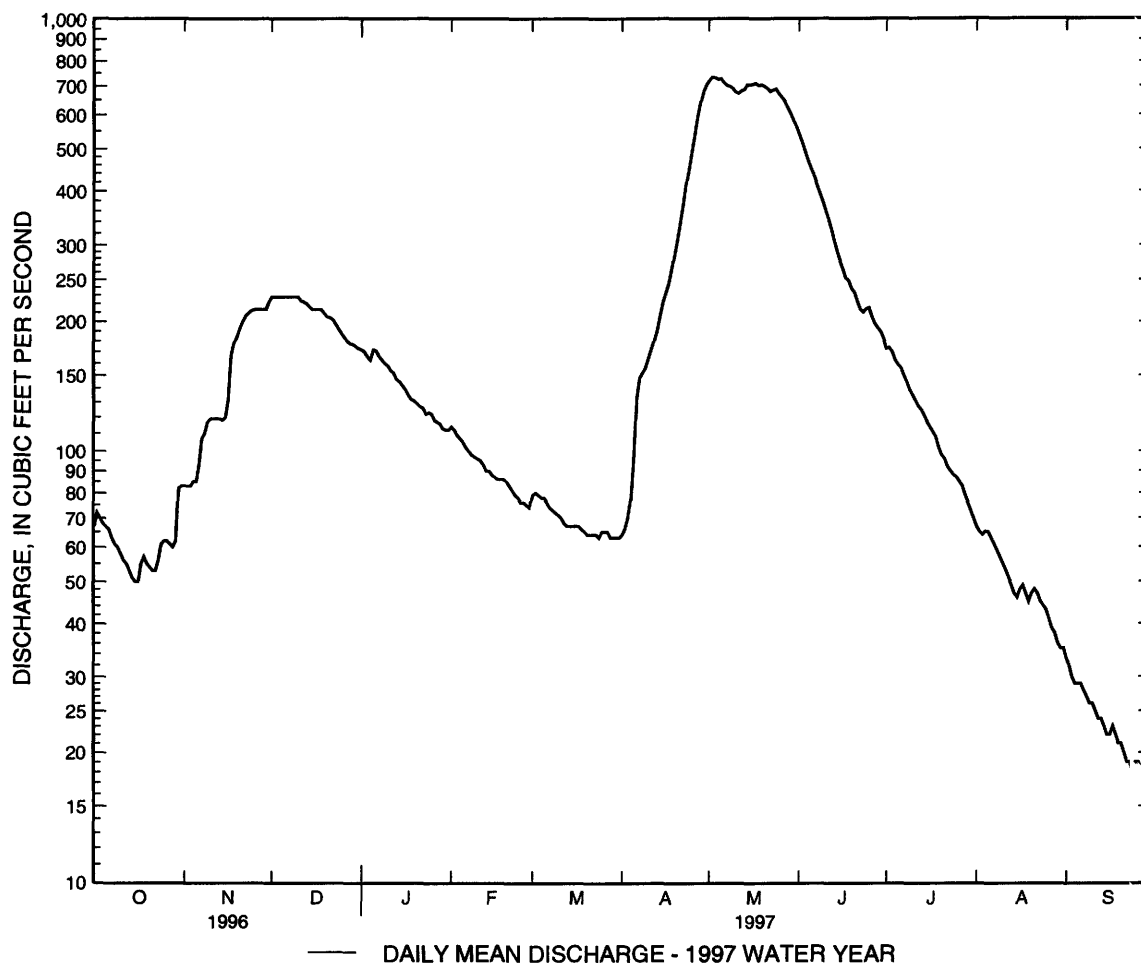
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	67	83	228	172	114	79	64	721	540	173	67	33
2	72	83	228	170	112	80	66	734	518	174	65	32
3	70	83	228	166	109	79	70	732	493	170	64	30
4	68	85	228	163	107	78	77	725	470	163	65	29
5	67	85	228	172	105	78	95	728	451	159	65	29
6	66	93	228	171	102	76	133	713	435	156	63	29
7	63	107	228	166	100	74	148	702	416	150	61	28
8	61	110	228	163	98	73	152	699	398	145	59	27
9	60	117	228	160	97	72	156	692	380	139	57	26
10	58	119	228	158	96	71	164	678	362	135	55	26
11	56	119	223	154	95	70	172	673	345	131	53	25
12	55	119	222	152	93	68	180	682	327	127	51	24
13	53	119	220	147	90	67	190	686	307	125	49	24
14	51	118	216	145	90	67	205	703	290	121	47	23
15	50	120	213	142	88	67	221	704	276	117	46	22
16	50	132	213	139	87	67	232	706	265	114	48	22
17	55	166	213	135	86	67	244	710	252	111	49	23
18	57	178	213	132	86	66	262	701	248	108	47	22
19	55	184	209	131	86	65	284	704	238	102	45	21
20	54	193	205	129	85	64	308	699	233	98	47	21
21	53	200	204	127	83	64	337	691	222	96	48	20
22	53	206	202	126	81	64	370	680	213	92	47	19
23	56	209	197	122	79	64	412	685	210	90	45	19
24	61	212	192	123	78	63	451	688	214	88	44	18
25	62	213	187	122	76	65	494	671	215	87	43	19
26	62	213	183	118	76	65	540	658	205	85	41	19
27	61	213	180	117	75	65	594	646	197	83	39	18
28	60	213	178	116	74	63	641	626	193	79	38	19
29	62	213	177	113	---	63	679	606	189	76	36	21
30	82	222	175	112	---	63	705	585	182	73	35	21
31	83	---	173	112	---	63	---	564	---	70	35	---
TOTAL	1883	4527	6475	4375	2548	2130	8646	21192	9284	3637	1554	709
MEAN	60.7	151	209	141	91.0	68.7	288	684	309	117	50.1	23.6
MAX	83	222	228	172	114	80	705	734	540	174	67	33
MIN	50	83	173	112	74	63	64	564	182	70	35	18
AC-FT	3730	8980	12840	8680	5050	4220	17150	42030	18410	7210	3080	1410
CFSM	.24	.60	.83	.56	.36	.27	1.14	2.70	1.22	.46	.20	.09
IN.	.28	.67	.95	.64	.37	.31	1.27	3.12	1.37	.53	.23	.10

LAKE OF THE WOODS BASIN

05124480 KAWISHIWI RIVER NEAR ELY, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	153	167	136	93.4	68.7	56.9	236	670	388	208	145	139
MAX	881	684	345	163	107	85.2	785	1133	1070	467	758	698
(WY)	1978	1971	1983	1984	1971	1969	1976	1979	1970	1968	1988	1988
MIN	12.1	9.43	7.25	5.32	4.77	5.87	8.95	13.3	115	74.5	46.7	18.5
(WY)	1977	1977	1977	1977	1977	1977	1977	1977	1977	1980	1976	1976
SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR				FOR 1997 WATER YEAR				WATER YEARS 1966 - 1997			
ANNUAL TOTAL	94547				66960				206			
ANNUAL MEAN	258				183				313			
HIGHEST ANNUAL MEAN									1710			
LOWEST ANNUAL MEAN									94.5			
HIGHEST DAILY MEAN	1310				May 20				1710			
LOWEST DAILY MEAN	50				Oct 15				4.5a			
ANNUAL SEVEN-DAY MINIMUM	53				Oct 11				4.6			
INSTANTANEOUS PEAK FLOW					738				May 2			
INSTANTANEOUS PEAK STAGE					4.92				May 2			
INSTANTANEOUS LOW FLOW					18				Sep 24			
ANNUAL RUNOFF (AC-FT)	187500				132800				149300			
ANNUAL RUNOFF (CFSM)	1.02				.73				.81			
ANNUAL RUNOFF (INCHES)	13.90				9.85				11.07			
10 PERCENT EXCEEDS	602				540				520			
50 PERCENT EXCEEDS	135				114				107			
90 PERCENT EXCEEDS	62				42				38			



LAKE OF THE WOODS BASIN

05127000 KAWISHIWI RIVER NEAR WINTON, MN

LOCATION.--Lat 47°56'05", long 91°45'50", in NE¼NW¼ sec. 20, T.63 N., R.11 W., Lake County, Hydrologic Unit 09030001, Superior National Forest, at power plant of Minnesota Power Co., just upstream from Fall Lake, and 1.8 mi east of Winton.

DRAINAGE AREA.--1,229 mi².

PERIOD OF RECORD.--June 1905 to June 1907, October 1912 to September 1919 (fragmentary), September 1923 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WDR MN-77-1: Drainage area.

REMARKS.--No estimated daily discharges. Records good. Daily discharge computed from power plant records. Flow regulated by power plant and by Camp Six, Bald Eagle, Gabbro, Little Gabbro, Birch, White Iron, South Farm, and Garden Lakes.

COOPERATION.--Records collected by Minnesota Power Co., under general supervision of Geological Survey, in connection with a Federal Power Commission project.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	285	1520	1970	907	512	590	879	3220	1840	1700	281	141
2	323	1520	1920	889	591	621	878	3040	1950	1920	282	141
3	163	1490	1570	887	683	621	877	2880	2030	1910	213	141
4	145	1380	851	887	683	621	875	2840	1710	1910	286	141
5	328	1120	734	886	683	621	874	2080	1390	1900	253	141
6	159	1330	878	749	683	924	874	2090	1400	1900	299	141
7	352	1460	885	755	683	535	873	1880	1330	1750	304	141
8	470	1510	885	755	517	409	885	2170	1150	1600	265	141
9	386	2200	842	755	512	410	1250	3320	1150	1210	235	141
10	282	2180	353	755	507	410	1820	3520	1150	883	204	257
11	228	1140	690	755	512	529	2050	3470	1150	883	158	317
12	321	1150	883	755	559	591	2010	3420	1160	884	149	149
13	469	1150	882	755	494	595	1970	3080	1150	884	195	140
14	469	1150	883	747	494	681	2000	2600	1150	884	255	140
15	469	887	883	887	494	503	2060	2680	1070	884	144	140
16	469	879	897	746	494	504	2440	2680	885	863	304	144
17	601	1510	911	746	494	504	2550	2670	885	553	182	192
18	881	1500	911	747	473	503	2640	2660	886	499	174	210
19	881	1510	911	802	502	446	2720	2910	886	327	143	192
20	641	1520	912	883	502	422	2840	3310	886	328	143	140
21	515	2260	913	883	631	422	2940	3620	886	328	304	117
22	800	2240	912	824	859	422	3060	3680	886	229	425	64
23	800	2210	913	848	792	422	3160	2870	886	187	366	33
24	800	1630	912	886	769	421	3270	3320	979	247	140	56
25	800	1630	913	828	698	421	3380	3260	1150	282	248	56
26	510	1610	913	755	455	421	3480	3210	1150	282	218	57
27	510	1610	911	810	402	488	3430	2740	1150	282	179	57
28	510	1990	911	772	402	874	3230	2070	1150	282	132	190
29	510	1980	911	759	---	764	3310	1820	1150	282	133	426
30	886	1970	910	731	---	881	3340	1830	1150	281	133	425
31	1520	---	912	511	---	880	---	1830	---	281	133	---
TOTAL	16483	47236	29682	24655	16080	17456	65965	86770	35745	26635	6880	4771
MEAN	532	1575	957	795	574	563	2199	2799	1192	859	222	159
MAX	1520	2260	1970	907	859	924	3480	3680	2030	1920	425	426
MIN	145	879	353	511	402	409	873	1820	885	187	132	33
+	-90.6	-18.3	-55.2	-171	-203	-116	472	43.7	31.2	-19.8	-31.2	-65.6
MEAN ‡	441	1556	902	624	371	447	2671	2843	1223	839	191	93.4
CFSM ‡	.36	1.27	.73	.51	.30	.36	2.17	2.31	1.00	.68	.16	.08
IN ‡	.42	1.42	.84	.59	.31	.42	2.42	2.66	1.12	.78	.18	.09
CAL. YR. 96	TOTAL 589739 MEAN 1611 MAX 8430 MIN 143 MEAN ‡ 1596 CFSM ‡ 1.30 IN ‡ 17.64											
WTR. YR. 97	TOTAL 378358 MEAN 1037 MAX 3680 MIN 33 MEAN ‡ 1018 CFSM ‡ 0.83 IN ‡ 11.25											

+ Change in contents, equivalent in cubic feet per second, in Camp Six, Bald Eagle, Gabbro, Little Gabbro, Birch, White Iron, Farm, South Farm, and Garden Lakes.

‡ Adjusted for change in reservoir contents.

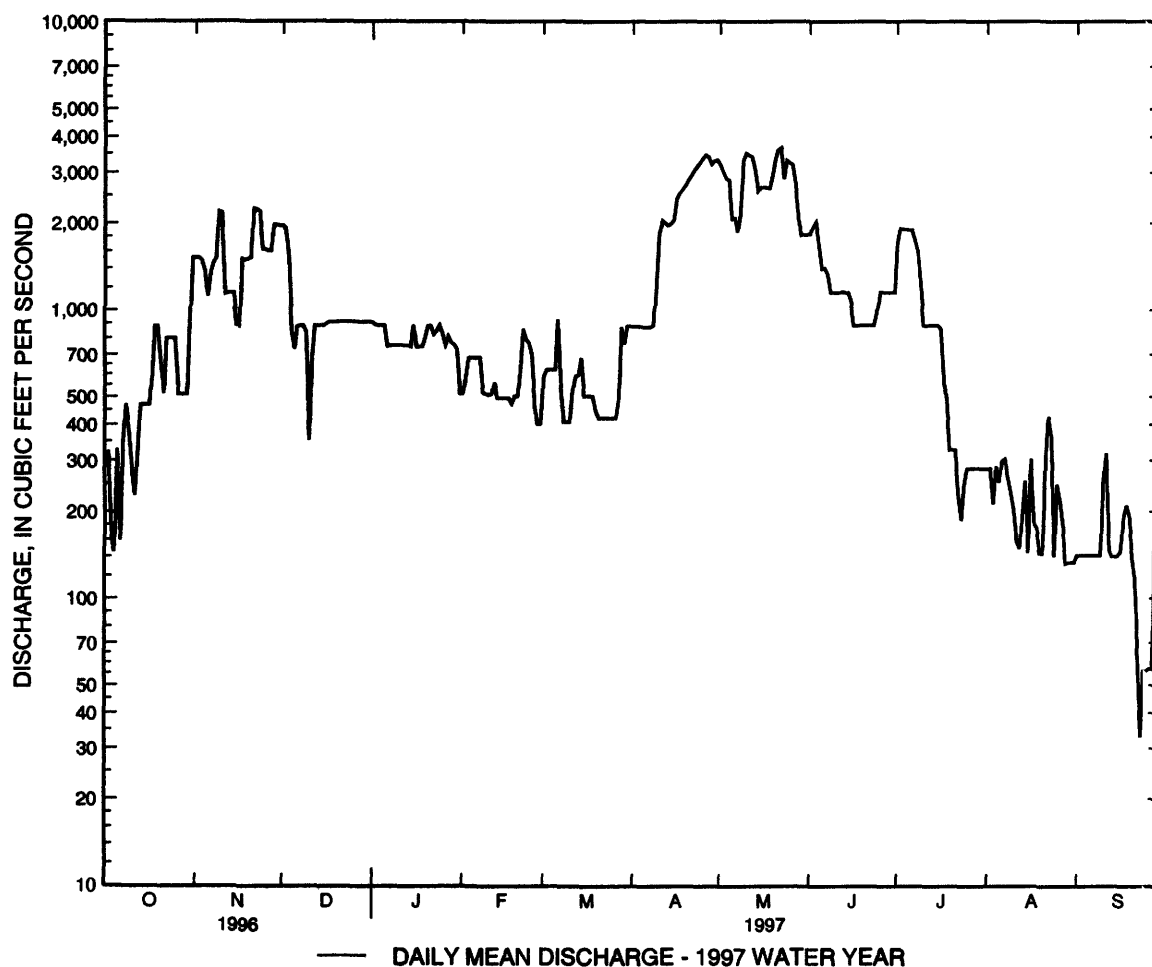
LAKE OF THE WOODS BASIN
05127000 KAWISHIWI RIVER NEAR WINTON, MN

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1905 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	897	762	594	455	351	378	1195	3138	1944	1162	688	742
MAX	4277	3572	1422	862	770	844	5020	9278	5661	2748	3775	3149
(WY)	1947	1971	1983	1978	1927	1945	1945	1950	1968	1944	1988	1928
MIN	66.5	8.97	76.1	80.3	74.5	103	19.3	111	519	217	51.7	38.1
(WY)	1924	1924	1977	1977	1977	1924	1924	1924	1980	1961	1919	1919

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1905 - 1997
ANNUAL TOTAL	589739	378358	
ANNUAL MEAN	1611	1037	1036
HIGHEST ANNUAL MEAN			1967
LOWEST ANNUAL MEAN			1950
HIGHEST DAILY MEAN	8430	May 19	240
LOWEST DAILY MEAN	143	Sep 14	16000
ANNUAL SEVEN-DAY MINIMUM	221	Sep 30	May 18 1950
ANNUAL RUNOFF (AC-FT)	1170000	750500	Aug 24 1905
ANNUAL RUNOFF (CFSM)	1.31	.84	Oct 13 1923
ANNUAL RUNOFF (INCHES)	17.85	11.45	
10 PERCENT EXCEEDS	4660	2570	
50 PERCENT EXCEEDS	872	848	
90 PERCENT EXCEEDS	370	177	

a Many days, several years.



LAKE OF THE WOODS BASIN

05127500 BASSWOOD RIVER NEAR WINTON, MN
(International Gaging Station)

LOCATION.--Lat 48°04'57", long 91°39'09", in SE 1/4 SE 1/4 sec. 30, T.65 N., R.10 W., Lake County, Hydrologic Unit 09030001, in Superior National Forest, on island in Jackfish Bay of Basswood Lake, used to determine discharge at outlet [lat 48°06'21", long 91°38'51", in sec. 19, T.65 N., R.10 W., on international boundary 14 mi northeast of Winton].

DRAINAGE AREA.--1,740 mi², approximately (above outlet of Basswood Lake).

PERIOD OF RECORD.--March to June 1924, September 1925 to March 1928, January 1930 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 955: Drainage area. WSP 1145: 1935, 1937.

GAGE.--Water-stage recorder. Datum of gage is 1,296.80 ft above sea level, 1928 datum, (levels by Geodetic Survey of Canada). Prior to Oct. 27, 1938, nonrecording gages at several sites in vicinity of gage, at datum 3.0 ft higher. Oct. 28, 1938 to Sept. 30, 1966, water-stage recorder at datum 3.0 ft higher.

REMARKS.--Records good. Satellite telemeter at station. Some regulation by power plant on Kawishiwi River at Winton, and by many lakes located upstream from station.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	622	794	2190	1450	1200	876	791	3590	3410	1560	546	249
2	623	870	2210	1450	1180	879	815	3640	3290	1620	520	237
3	608	964	2230	1430	1150	877	845	3680	3180	1640	506	231
4	595	1040	2230	1430	1130	891	886	3790	3100	1680	498	225
5	574	1090	2200	1470	1110	896	962	3910	3040	1720	473	227
6	546	1140	2130	1460	1100	881	1110	3980	2950	1760	449	222
7	533	1200	2050	1450	1090	877	1220	4040	2850	1780	433	218
8	513	1250	1980	1440	1080	872	1310	4080	2710	1800	422	212
9	495	1300	1940	1420	1070	858	1370	4160	2590	1790	402	203
10	489	1360	1880	1400	1040	833	1430	4190	2470	1770	384	200
11	478	1430	1820	1390	1030	815	1520	4200	2370	1720	373	195
12	465	1480	1750	1370	1010	794	1610	4250	2260	1680	357	191
13	453	1500	1700	1360	985	784	1720	4280	2160	1630	340	188
14	457	1520	1660	1340	964	785	1830	4240	2050	1580	330	185
15	449	1540	1630	1330	946	794	1940	4160	1960	1540	320	182
16	445	1570	1620	1310	930	800	2050	4090	1890	1500	330	190
17	483	1680	1610	1290	922	783	2150	4000	1840	1450	318	190
18	490	1700	1610	1270	908	775	2250	3930	1820	1400	311	188
19	507	1750	1590	1260	898	772	2370	3920	1760	1340	305	181
20	520	1790	1580	1250	873	760	2480	3910	1710	1230	312	175
21	539	1830	1570	1240	856	756	2600	3950	1660	1160	309	172
22	549	1890	1550	1230	845	748	2710	4000	1610	1080	302	165
23	574	1960	1530	1220	847	743	2830	4040	1610	1000	298	164
24	605	2000	1520	1240	857	732	2950	4050	1650	931	295	159
25	619	2030	1500	1250	868	747	3060	4050	1640	873	293	153
26	629	2040	1490	1240	869	740	3180	4030	1620	815	285	151
27	623	2050	1470	1220	863	729	3310	4010	1610	751	277	150
28	626	2060	1470	1220	848	718	3420	3960	1590	702	275	154
29	644	2080	1460	1210	---	723	3480	3840	1580	657	270	159
30	734	2130	1460	1200	---	740	3540	3690	1570	623	262	162
31	748	---	1460	1200	---	762	---	3550	---	586	258	---
TOTAL	17235	47038	54090	41040	27469	24740	61739	123210	65550	41368	11053	5678
MEAN	556	1568	1745	1324	981	798	2058	3975	2185	1334	357	189
MAX	748	2130	2230	1470	1200	896	3540	4280	3410	1800	546	249
MIN	445	794	1460	1200	845	718	791	3550	1570	586	258	150
AC-FT	34190	93300	107300	81400	54480	49070	122500	244400	130000	82050	21920	11260
CFSM	.32	.90	1.00	.76	.56	.46	1.18	2.28	1.26	.77	.20	.11
IN.	.37	1.01	1.16	.88	.59	.53	1.32	2.63	1.40	.88	.24	.12

LAKE OF THE WOODS BASIN

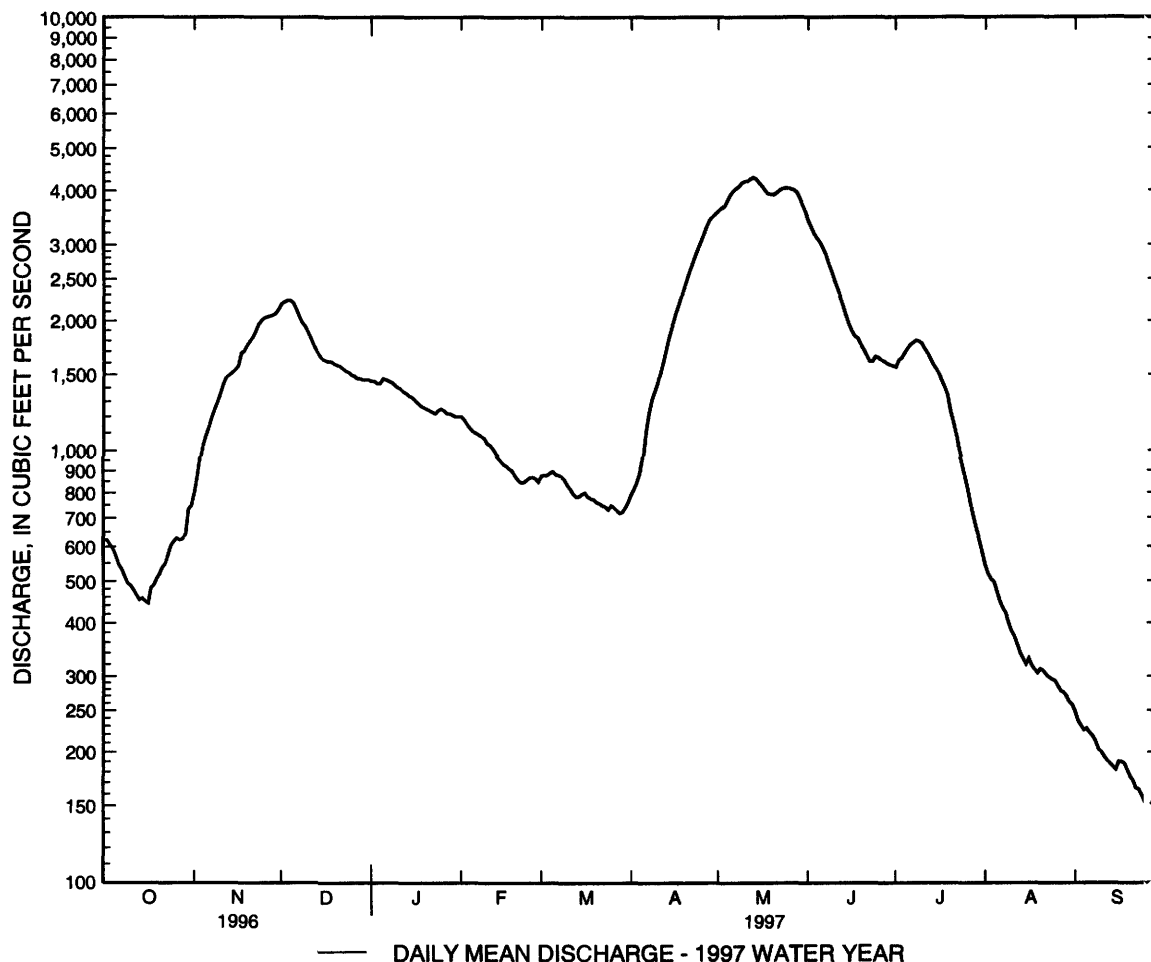
05127500 BASSWOOD RIVER NEAR WINTON, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1095	1026	884	733	605	576	1211	3763	2887	1835	1115	992
MAX	5320	3879	2510	1475	1229	1143	5069	9114	7332	4453	3487	5034
(WY)	1978	1971	1983	1966	1966	1966	1945	1950	1950	1944	1944	1988
MIN	65.1	60.2	76.2	86.2	95.0	135	269	225	696	512	323	120
(WY)	1977	1977	1977	1977	1977	1977	1977	1977	1980	1980	1980	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1931 - 1997
ANNUAL TOTAL	714580	520210	
ANNUAL MEAN	1952	1425	1407
HIGHEST ANNUAL MEAN			2643
LOWEST ANNUAL MEAN			557
HIGHEST DAILY MEAN	6960	May 21	4280
LOWEST DAILY MEAN	445	Oct 16	150
ANNUAL SEVEN-DAY MINIMUM	461	Oct 11	155
INSTANTANEOUS PEAK FLOW			4300
INSTANTANEOUS PEAK STAGE			5.57
INSTANTANEOUS LOW FLOW			147
ANNUAL RUNOFF (AC-FT)	1417000	1032000	1019000
ANNUAL RUNOFF (CFSM)	1.12	.82	.81
ANNUAL RUNOFF (INCHES)	15.28	11.12	10.98
10 PERCENT EXCEEDS	4260	3300	3250
50 PERCENT EXCEEDS	1400	1230	870
90 PERCENT EXCEEDS	641	290	382

a Present datum.



LAKE OF THE WOODS BASIN

05128000 NAMAKAN RIVER AT OUTLET OF LAC LA CROIX, ONTARIO
(International Gaging Station)

LOCATION.--Lat 48°21'14", long 92°13'01", at Campbell's Camp, on Lac La Croix Lake, used to determine discharge at outlet [Lat 48°23'00", long 92°10'40", 2.5 mi east of Campbell's Camp].

DRAINAGE AREA.--5,170 mi².

PERIOD OF RECORD.--September 1921 to January 1922, April 1922 to current year, in reports of Geological Survey. Monthly discharge only for some periods, published in WSP 1308. August 1921 to current year, in reports of Water Survey of Canada.

GAGE.--Water-stage recorder. Gage readings have been reduced to elevations, United States and Canada Boundary Survey datum. Prior to October 1933, nonrecording gages at various sites on Lac la Croix. October 1933 to Mar. 13, 1963, nonrecording gage at present site and datum.

REMARKS.--Records good. Satellite telemeter at station.

COOPERATION.--This station is one of the international stations maintained by Canada under agreement with the United States.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3060	3080	6000	4480	3600	2750	2390	7660	9110	5190	3430	1690
2	3000	3200	6000	4410	3600	2750	2380	7870	9040	5230	3350	1630
3	2970	3290	6040	4380	3530	2750	2380	8050	8930	5080	3310	1600
4	2950	3370	6040	4340	3520	2750	2390	8230	8830	5050	3280	1570
5	2920	3430	6070	4310	3490	2740	2460	8300	8690	4980	3200	1570
6	2850	3520	6070	4310	3460	2700	2630	8470	8620	4910	3100	1560
7	2850	3570	6070	4270	3430	2700	2790	8650	8510	4870	3020	1550
8	2820	3710	6040	4240	3350	2680	2980	8720	8300	4840	2960	1510
9	2780	3780	6040	4200	3290	2660	3150	8900	8160	4800	2860	1470
10	2760	3850	6000	4130	3270	2640	3330	9040	7980	4730	2730	1440
11	2730	3950	5970	4100	3230	2620	3490	9070	7800	4700	2670	1420
12	2720	3990	5900	4060	3200	2600	3640	9150	7590	4660	2580	1400
13	2670	4060	5860	4030	3180	2590	3780	9290	7490	4630	2500	1380
14	2690	4170	5790	4060	3140	2580	3880	9360	7240	4590	2460	1340
15	2620	4270	5720	4270	3120	2560	4030	9360	7030	4590	2390	1320
16	2600	4410	5650	4270	3090	2550	4170	9430	6890	4590	2380	1350
17	2670	4660	5580	4200	3070	2530	4340	9430	6740	4590	2330	1350
18	2630	4800	5510	4170	3040	2530	4480	9460	6670	4550	2280	1350
19	2710	5010	5470	4100	3010	2500	4700	9500	6600	4520	2230	1320
20	2700	5160	5400	4030	2990	2490	4870	9500	6430	4450	2210	1270
21	2670	5300	5300	3990	2950	2480	5120	9500	6210	4410	2180	1240
22	2650	5440	5230	3920	2920	2500	5370	9500	6040	4310	2120	1230
23	2660	5540	5120	3880	2880	2500	5650	9500	5970	4240	2080	1200
24	2670	5650	5010	3850	2850	2440	5900	9530	5930	4170	2030	1170
25	2710	5720	4940	3810	2830	2450	6140	9530	5760	4130	2000	1160
26	2720	5760	4870	e3740	2790	2450	6390	9500	5650	4030	1940	1150
27	2680	5830	4770	e3710	2760	2440	6640	9430	5540	3880	1890	1150
28	2740	5860	4700	e3670	2750	2420	6960	9390	5400	3810	1840	1140
29	2820	5830	4660	e3640	---	2410	7170	9360	5300	3740	1810	1180
30	2800	5930	4590	3600	---	2400	7490	9250	5230	3640	1780	1190
31	2920	---	4520	3640	---	2400	---	9180	---	3530	1730	---
TOTAL	85740	136140	170930	125810	88340	79560	131090	281110	213680	139440	76670	40900
MEAN	2766	4538	5514	4058	3155	2566	4370	9068	7123	4498	2473	1363
MAX	3060	5930	6070	4480	3600	2750	7490	9530	9110	5230	3430	1690
MIN	2600	3080	4520	3600	2750	2400	2380	7660	5230	3530	1730	1140
AC-FT	170100	270000	339000	249500	175200	157800	260000	557600	423800	276600	152100	81130
CFSM	.53	.88	1.07	.78	.61	.50	.85	1.75	1.38	.87	.48	.26
IN.	.62	.98	1.23	.91	.64	.57	.94	2.02	1.54	1.00	.55	.29

e Estimated

LAKE OF THE WOODS BASIN

05128000 NAMAKAN RIVER AT OUTLET OF LAC LA CROIX, ONTARIO--Continued

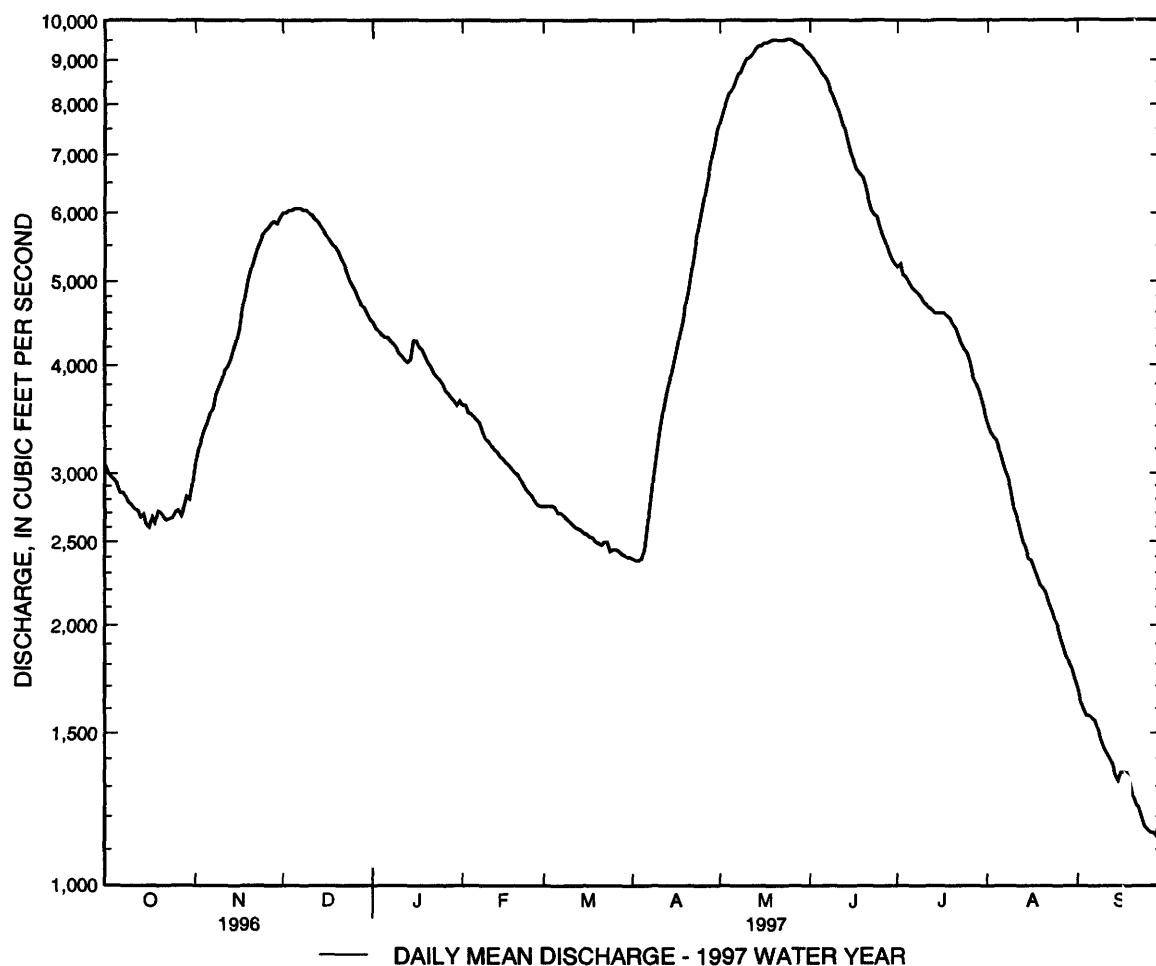
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	3091	2942	2624	2208	1902	1687	2567	7720	8050	6145	4064	3175
MAX	14200	10610	7189	4568	3432	2996	9071	16900	22120	15930	11200	13140
(WY)	1978	1978	1972	1978	1966	1966	1945	1938	1950	1968	1944	1988
MIN	835	624	567	547	540	535	614	899	1475	1263	1141	1223
(WY)	1977	1977	1977	1977	1924	1924	1977	1977	1924	1924	1980	1933

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1921 - 1997
ANNUAL TOTAL	2111340	1569410	
ANNUAL MEAN	5769	4300	3866
HIGHEST ANNUAL MEAN			7270
LOWEST ANNUAL MEAN			964
HIGHEST DAILY MEAN	16600	May 27	9530
LOWEST DAILY MEAN	2260	Apr 13	1140
ANNUAL SEVEN-DAY MINIMUM	2270	Apr 11	1160
INSTANTANEOUS PEAK FLOW		9570	May 24
INSTANTANEOUS PEAK STAGE		1187.10	May 24
INSTANTANEOUS LOW FLOW		1040	Sep 28
ANNUAL RUNOFF (AC-FT)	4188000	3113000	2801000
ANNUAL RUNOFF (CFSM)	1.12	.83	.75
ANNUAL RUNOFF (INCHES)	15.19	11.29	10.16
10 PERCENT EXCEEDS	11500	8190	8380
50 PERCENT EXCEEDS	4520	3810	2700
90 PERCENT EXCEEDS	2620	1980	1190

a Occurred May 31 to June 2, 1950.

b Many days in 1924.



LAKE OF THE WOODS BASIN

05129115 VERMILION RIVER NEAR CRANE LAKE, MN

LOCATION.--Lat 48°15'53", long 92°33'57", in NE1/4NE1/4 sec. 30, T.67 N., R.17 W., St. Louis County, Hydrologic Unit 09030002, in Superior National Forest, on left bank 350 ft downstream from bridge on Forest Route 491, 3.5 mi upstream from mouth, and 3.5 mi west of city of Crane Lake.

DRAINAGE AREA.-- 906 mi².

PERIOD OF RECORD.--August 1979 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,180 ft above sea level, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are fair.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 1979 reached a stage of 15.15 ft, from high-water mark, discharge, about 4,600 ft³/s.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	402	1340	e860	e540	e410	e340	420	2080	1190	722	330	122
2	393	1240	e850	e530	e410	e340	548	2020	1130	759	309	115
3	390	1150	e830	e530	e410	e340	758	1960	1080	839	294	109
4	369	1060	e820	e520	e410	e350	1050	1900	1030	887	289	104
5	345	984	e800	e520	e410	e350	1400	1830	1010	870	274	105
6	314	952	e780	e520	e400	e350	1750	1800	987	858	262	99
7	283	998	e770	e510	e400	e350	2030	1780	946	826	250	95
8	264	1020	e760	e510	e390	e350	2480	1780	915	791	240	91
9	247	1000	e750	e500	e390	e350	2630	1780	878	756	234	88
10	237	962	e730	e500	e390	e340	2490	1790	832	720	223	82
11	234	891	e720	e490	e380	e340	2340	1770	786	687	208	79
12	227	864	e710	e490	e380	e340	2200	1730	742	660	196	74
13	215	816	e700	e480	e380	e340	2110	1700	692	639	182	71
14	199	774	e690	e470	e370	e330	2120	1670	651	621	171	67
15	205	756	e680	e460	e370	e330	e2170	1630	625	614	163	63
16	197	749	e670	e450	e370	e330	2220	1590	590	599	169	72
17	232	881	e660	e450	e370	e330	2280	1550	562	582	166	87
18	389	1080	e640	e440	e360	e330	2300	1500	568	557	159	80
19	480	1180	e630	e430	e360	e330	2330	1510	562	541	154	80
20	515	1210	e620	e430	e360	e330	2400	1530	575	527	161	80
21	520	1210	e610	e430	e350	e330	2420	1540	557	505	161	79
22	499	1180	e600	e420	e350	e330	2430	1520	536	493	160	76
23	468	e1110	e590	e420	e350	e330	2390	1520	524	477	158	75
24	455	e1050	e570	e420	e340	330	2350	1540	587	458	157	74
25	444	e1000	e560	e420	e340	330	2290	1540	698	439	157	67
26	441	e950	e550	e420	e340	332	2240	1520	704	431	154	65
27	544	e910	e550	e420	e340	347	2200	1490	681	415	146	62
28	604	e880	e540	e420	e340	358	2220	1430	696	390	137	74
29	614	e860	e540	e420	---	367	2190	1370	711	372	134	89
30	1080	e860	e540	e420	---	381	2130	1300	707	355	132	91
31	1380	---	e540	e420	---	389	---	1240	---	339	129	---
TOTAL	13186	29917	20860	14400	10470	10614	60886	50910	22752	18729	6059	2515
MEAN	425	997	673	465	374	342	2030	1642	758	604	195	83.8
MAX	1380	1340	860	540	410	389	2630	2080	1190	887	330	122
MIN	197	749	540	420	340	330	420	1240	524	339	129	62
AC-FT	26150	59340	41380	28560	20770	21050	120800	101000	45130	37150	12020	4990
CFSM	.47	1.10	.74	.51	.41	.38	2.24	1.81	.84	.67	.22	.09
IN.	.54	1.23	.86	.59	.43	.44	2.50	2.09	.93	.77	.25	.10

e Estimated

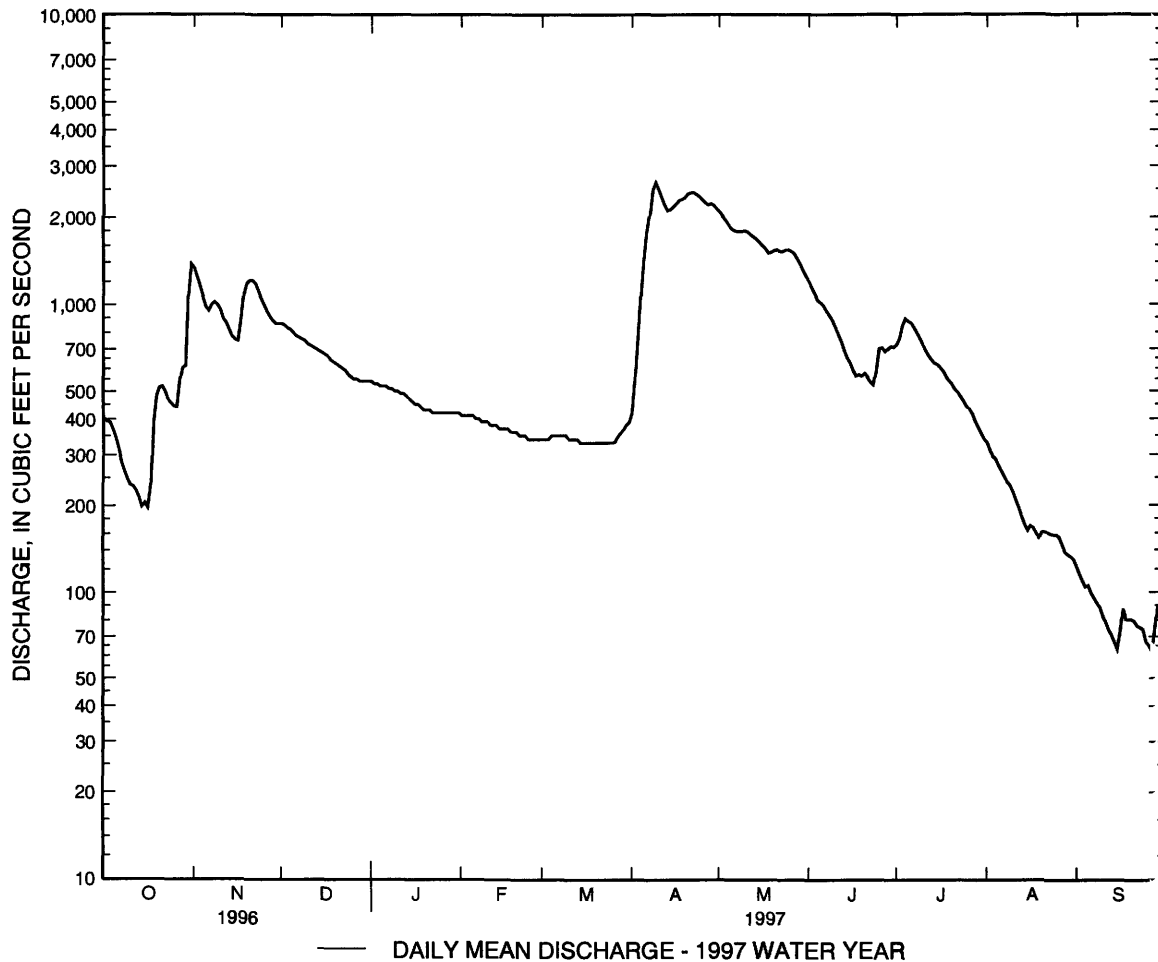
LAKE OF THE WOODS BASIN

05129115 VERMILION RIVER NEAR CRANE LAKE, MN

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1979 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	609	571	432	305	249	295	1166	1447	968	800	491	482
MAX	1436	1138	872	476	374	574	2030	2496	1840	1609	1612	1880
(WY)	1996	1983	1983	1996	1997	1995	1997	1996	1985	1985	1988	1988
MIN	181	152	116	97.8	94.1	89.5	627	507	205	113	60.0	83.8
(WY)	1980	1988	1988	1988	1988	1988	1987	1980	1980	1980	1980	1997

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1979 - 1997
ANNUAL TOTAL	302264	261298	
ANNUAL MEAN	826	716	654
HIGHEST ANNUAL MEAN			922
LOWEST ANNUAL MEAN			326
HIGHEST DAILY MEAN	3080	Apr 27	2630
LOWEST DAILY MEAN	197	Oct 16	62
ANNUAL SEVEN-DAY MINIMUM	202	Sep 19	70
INSTANTANEOUS PEAK FLOW			2640
INSTANTANEOUS PEAK STAGE			12.50
INSTANTANEOUS LOW FLOW			59
ANNUAL RUNOFF (AC-FT)	599500	518300	473800
ANNUAL RUNOFF (CFSM)	.91	.79	.72
ANNUAL RUNOFF (INCHES)	12.41	10.73	9.81
10 PERCENT EXCEEDS	2200	1740	1460
50 PERCENT EXCEEDS	540	520	448
90 PERCENT EXCEEDS	322	154	166



LAKE OF THE WOODS BASIN

05129400 RAINY LAKE NEAR FORT FRANCES, ONTARIO
(International Gaging Station)

LOCATION.--Lat 48°38'30", long 93°20'00", at Five Mile dock, approximately 5 mi northeast of city of Fort Frances.

PERIOD OF RECORD.--January 1910 to September 1917 and October 1934 to current year, in reports of Geological Survey. August 1911 to current year, in reports of Water Survey of Canada. Prior to October 1949, published as "at Ranier, Minn.", and as "at Fort Frances, Ontario" October 1949 to September 1964.

GAGE.--Water-stage recorder. Datum of gage is sea level (United States and Canadian Boundary Survey). January 1910 to December 1949, nonrecording gage 31 northeast at Ranier, Minn., at same datum. January 1950 to October 1964, water-stage recorder on Government dock at Pither's Point at Fort Frances, and supplementary gage in town pumping station, 0.5 mi south, used during winter months, at same datum.

COOPERATION.--This station is one of the international gaging stations maintained by Canada under agreement with the United States.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation observed, 1,112.97 ft, July 5, 1950; minimum observed, 1,101.26 ft, Apr. 17, 1923, Apr. 2, 1930.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 1107.88 ft, Nov. 19; maximum daily elevation, 1107.87 ft, Nov. 19; minimum, 1105.03 ft., Mar. 28., minimum daily, 1105.04 ft, Mar. 29.

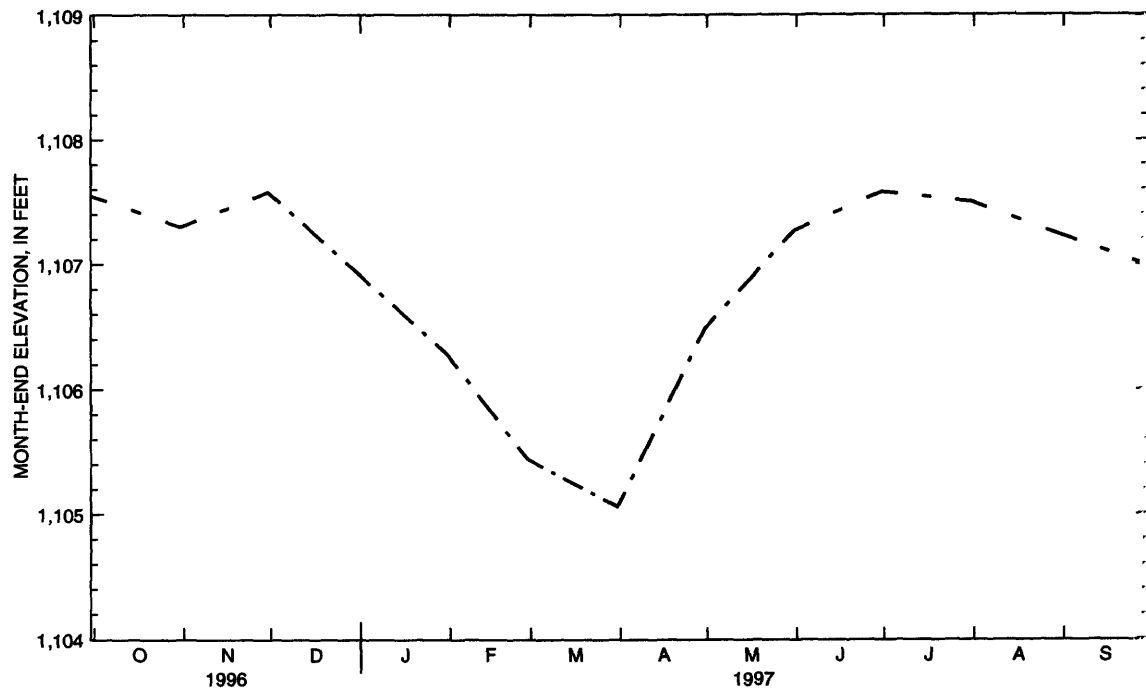
MONTH-END ELEVATION, IN SEA LEVEL, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

Oct. 31	1107.30	Feb. 28	1105.44	June 30.....	1107.58
Nov. 30	1107.58	Mar. 31	1105.06	July 31	1107.50
Dec. 31.....	1106.93	Apr. 30.....	1106.49	Aug. 31	1107.23
Jan. 31.....	1106.28	May 31.....	1107.27	Sept. 30.....	1106.99

NOTE.--Elevations other than those shown are available.

LAKE OF THE WOODS BASIN

05129400 RAINY LAKE NEAR FORT FRANCES, ONTARIO--Continued



LAKE OF THE WOODS BASIN

05130500 STURGEON RIVER NEAR CHISHOLM, MN

LOCATION.--Lat 47°40'25", long 92°54'00", in NE 1/4 NW 1/4, sec. 20, T.60 N., R.20 W., St. Louis County, Hydrologic Unit 09030005, on left bank 1,000 ft upstream from highway bridge, 0.6 mi downstream from East Branch Sturgeon River, and 11.5 mi north of Chisholm.

DRAINAGE AREA.--187 mi².

PERIOD OF RECORD.--August 1942 to current year.

REVISED RECORDS.--WSP 1438: 1946.

GAGE.--Water-stage recorder. Datum of gage is 1,305.7 ft above sea level. Prior to Aug. 24, 1944, nonrecording gage at site 1,000 ft downstream at different datum. Aug. 25, 1944 to Sept. 30, 1975 at present site at datum 1.00 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are fair.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base of 500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 06	1800	*1520	5.58	Apr. 08	1600	---	*a5.71

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	87	325	e112	e74	e49	e44	e130	340	127	245	59	35
2	80	299	e110	e73	e49	e44	e230	306	117	220	56	32
3	74	262	e109	e72	e48	e44	e300	278	110	219	52	30
4	70	241	e108	e71	e48	e43	e480	255	103	263	50	30
5	69	248	e107	e70	e48	e43	e720	237	99	287	48	31
6	76	245	e106	e69	e47	e42	1350	225	95	295	46	30
7	66	263	e105	e68	e47	e42	e1320	213	94	253	45	30
8	63	263	e104	e68	e47	e42	e1250	211	88	212	42	30
9	65	254	e103	e68	e47	e42	e1100	211	81	174	41	30
10	63	e220	e102	e68	e47	e41	e1000	207	75	148	39	28
11	63	e200	e100	e67	e47	e41	830	203	68	127	37	27
12	60	e185	e99	e67	e47	e41	681	200	60	115	35	26
13	60	e175	e98	e66	e47	e40	638	198	57	117	33	26
14	60	e167	e97	e66	e47	e40	641	198	48	123	31	25
15	61	e160	e96	e65	e47	e40	689	213	45	130	30	26
16	60	e165	e95	e65	e46	e40	650	218	43	121	32	47
17	138	e230	e93	e64	e46	e39	618	207	39	108	32	60
18	255	e280	e92	e64	e46	e39	613	194	46	95	31	59
19	275	e300	e90	e63	e46	e39	684	225	37	88	34	59
20	258	e270	e89	e63	e46	e39	748	239	38	95	49	57
21	230	e220	e87	e62	e45	e38	776	238	34	89	51	52
22	201	e190	e85	e61	e45	e38	738	225	32	84	53	47
23	188	e165	e83	e60	e45	e38	670	230	39	78	53	42
24	187	e145	e82	e59	e45	e38	595	238	77	74	50	40
25	180	e135	e80	e57	e45	e38	532	231	150	70	48	36
26	174	e125	e79	e56	e45	e39	481	214	158	74	46	33
27	173	e122	e78	e55	e45	e43	448	193	147	80	42	33
28	161	e118	e77	e54	e44	e49	422	179	183	79	39	41
29	169	e116	e76	e53	---	e59	396	159	244	77	37	47
30	297	e114	e75	e51	---	e72	357	147	256	68	36	47
31	340	---	e75	e50	---	e90	---	136	---	62	35	---
TOTAL	4303	6202	2892	1969	1301	1367	20087	6768	2790	4270	1312	1136
MEAN	139	207	93.3	63.5	46.5	44.1	670	218	93.0	138	42.3	37.9
MAX	340	325	112	74	49	90	1350	340	256	295	59	60
MIN	60	114	75	50	44	38	130	136	32	62	30	25
AC-FT	8540	12300	5740	3910	2580	2710	39840	13420	5530	8470	2600	2250
CFSM	.74	1.11	.50	.34	.25	.24	3.58	1.17	.50	.74	.23	.20
IN.	.86	1.23	.58	.39	.26	.27	4.00	1.35	.56	.85	.26	.23

a Backwater from ice.

e Estimated

LAKE OF THE WOODS BASIN

05130500 STURGEON RIVER NEAR CHISHOLM, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1997, BY WATER YEAR (WY)

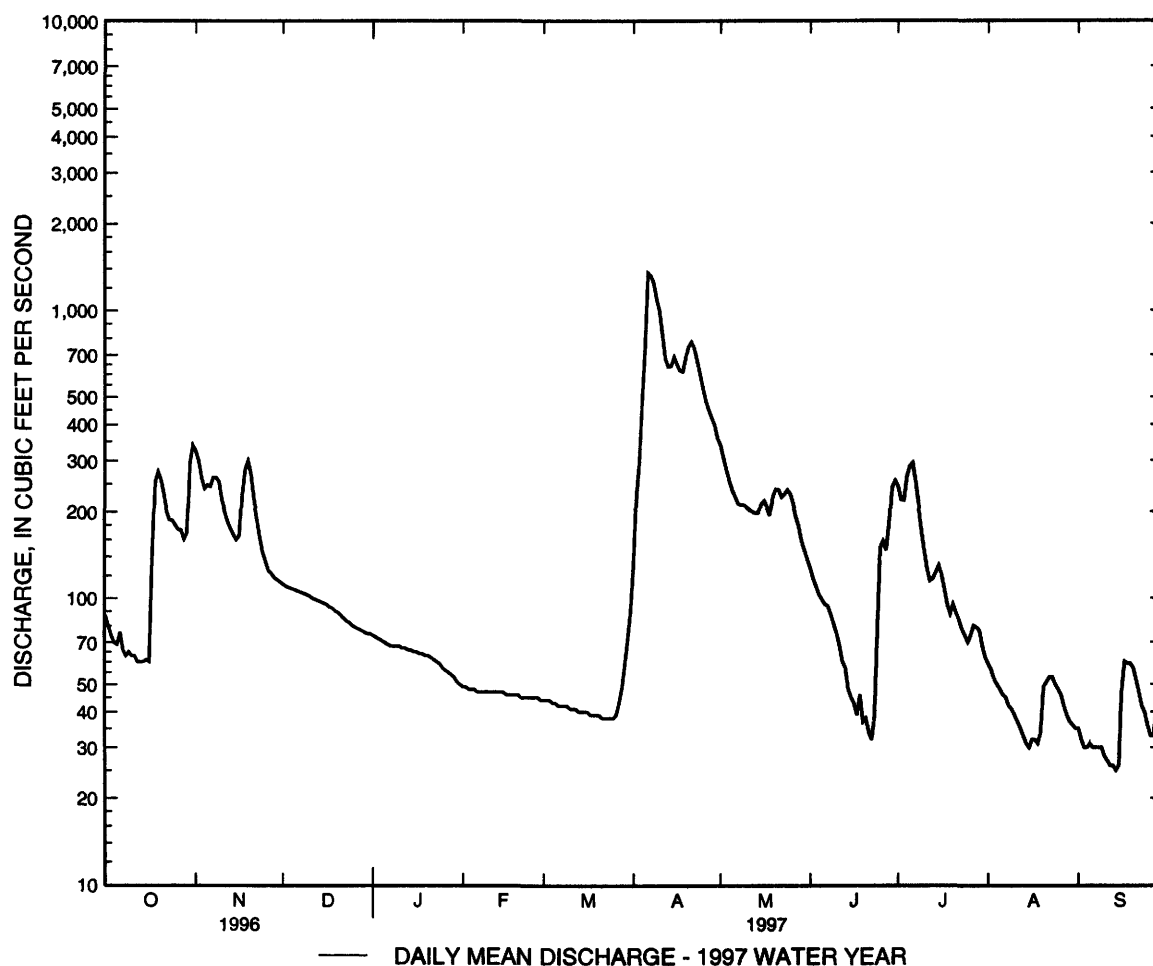
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	122	94.1	47.9	29.3	23.3	49.7	371	304	185	120	71.7	53.1
MAX	600	264	115	66.0	47.7	337	868	1451	528	623	268	424
(WY)	1996	1978	1978	1966	1984	1945	1948	1950	1944	1993	1988	1977
MIN	7.85	8.90	4.82	3.98	4.54	10.0	41.0	22.9	14.7	5.99	12.6	4.60
(WY)	1977	1977	1977	1977	1977	1957	1977	1977	1988	1988	1961	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1942 - 1957
ANNUAL TOTAL	65538	54397	
ANNUAL MEAN	179	149	126
HIGHEST ANNUAL MEAN			218
LOWEST ANNUAL MEAN			63.1
HIGHEST DAILY MEAN	1720	Apr 20	3530
LOWEST DAILY MEAN	27	Feb 18	2.5
ANNUAL SEVEN-DAY MINIMUM	28	Feb 16	3.0
INSTANTANEOUS PEAK FLOW		1520	3630 ^a
INSTANTANEOUS PEAK STAGE		5.71 ^b	7.41 ^c
INSTANTANEOUS LOW FLOW		24	
ANNUAL RUNOFF (AC-FT)	130000	107900	91380
ANNUAL RUNOFF (CFSM)	.96	.80	.67
ANNUAL RUNOFF (INCHES)	13.04	10.82	9.17
10 PERCENT EXCEEDS	393	290	298
50 PERCENT EXCEEDS	91	75	58
90 PERCENT EXCEEDS	36	38	17

a From rating extended above 1600 ft³/s, on basis of slope-area measurement of peak flow.

b Backwater from ice.

c Present datum.



LAKE OF THE WOODS BASIN

05131448 WOOD DUCK RIVER NEAR NETT LAKE, MN

LOCATION.-- Lat 48°09'24", long 93°08'20", in SW¹/₄SW¹/₄ sec. 35, T.66 N., R.22 W., Koochiching County, Hydrologic Unit 090300, at bridge on Indian S
Road, 2.9 miles above mouth at Nett Lake, and 3.5 miles northwest of the town of Nett Lake.

PERIOD OF RECORD.-- October 1995 to current year.

GAGE.-- Water-stage recorder. Elevation of gage 1,275 ft above mean sea level (from topographic map).

REMARKS.-- Records good except those for estimated daily discharges, which are poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	e63	e17	e8.3	e4.5	e3.4	e15	67	25	16	1.6	.81
2	24	e56	e16	e8.1	e4.4	e3.4	e25	59	22	22	1.4	.75
3	24	e51	e16	e7.9	e4.3	e3.4	e50	50	18	51	1.4	.73
4	24	e48	e15	e7.7	e4.2	e3.4	e66	45	16	91	1.3	.73
5	23	e48	e15	e7.5	e4.2	e3.4	e94	42	16	88	1.1	.77
6	22	e48	e14	e7.3	e4.1	e3.4	e125	45	14	69	.99	.74
7	22	e50	e14	e7.1	e4.0	e3.4	e200	54	13	52	.93	.79
8	21	e51	e14	e7.0	e3.9	e3.4	e230	49	11	41	1.0	.87
9	20	e49	e13	e6.8	e3.9	e3.4	e210	55	9.5	32	.91	.86
10	21	e44	e13	e6.7	e3.8	e3.4	e180	57	8.5	27	.67	.82
11	21	e40	e13	e6.6	e3.8	e3.4	e130	53	7.7	23	.63	.81
12	20	e36	e12	e6.5	e3.7	e3.4	e115	52	7.1	22	.60	.81
13	20	e34	e12	e6.4	e3.6	e3.4	e105	51	6.2	20	.54	.87
14	21	e33	e12	e6.3	e3.6	e3.4	e100	46	5.6	20	.57	.87
15	19	e33	e11	e6.2	e3.5	e3.4	e105	45	5.5	32	.56	.87
16	19	e40	e11	e6.1	e3.5	e3.4	e105	44	5.2	28	.60	1.5
17	22	e64	e11	e6.0	e3.4	e3.4	e100	41	4.9	18	.59	1.7
18	32	e60	e11	e5.9	e3.4	e3.4	e100	36	5.5	13	.57	1.6
19	39	e45	e11	e5.8	e3.4	e3.4	120	45	4.8	10	.63	1.7
20	41	e33	e10	e5.7	e3.4	e3.4	145	52	6.0	7.8	.78	1.6
21	39	e28	e10	e5.6	e3.4	e3.4	155	50	5.9	6.3	.75	1.6
22	36	e25	e9.9	e5.5	e3.4	e3.4	149	48	5.6	5.0	.75	1.7
23	34	e23	e9.7	e5.4	e3.4	e3.4	135	54	6.3	4.0	.80	1.7
24	34	e22	e9.5	e5.3	e3.4	e3.5	124	65	12	3.6	.86	1.8
25	33	e20	e9.4	e5.2	e3.4	e3.6	111	69	16	3.2	.88	1.7
26	32	e20	e9.3	e5.0	e3.4	e3.8	100	62	16	3.5	.85	1.8
27	32	e19	e9.2	e4.9	e3.4	e4.0	93	54	13	3.3	.79	2.0
28	32	e18	e9.0	e4.8	e3.4	e4.5	87	46	17	2.7	.78	3.3
29	34	e18	e8.8	e4.7	---	e5.5	80	39	19	2.4	.81	5.0
30	61	e17	e8.6	e4.7	---	e7.0	74	33	18	2.3	.83	5.9
31	e73	---	e8.5	e4.6	---	e10	---	29	---	2.1	.80	---
TOTAL	919	1136	362.9	191.6	103.8	120.1	3428	1537	340.3	721.2	26.27	46.70
MEAN	29.6	37.9	11.7	6.18	3.71	3.87	114	49.6	11.3	23.3	.85	1.56
MAX	73	64	17	8.3	4.5	10	230	69	25	91	1.6	5.9
MIN	19	17	8.5	4.6	3.4	3.4	15	29	4.8	2.1	.54	.73
AC-FT	1820	2250	720	380	206	238	6800	3050	675	1430	52	93
CFSM	.93	1.19	.37	.19	.12	.12	3.59	1.56	.36	.73	.03	.05
IN.	1.08	1.33	.42	.22	.12	.14	4.01	1.80	.40	.84	.03	.05

e Estimated

LAKE OF THE WOODS BASIN

05131448 WOOD DUCK RIVER NEAR NETT LAKE, MN--Continued

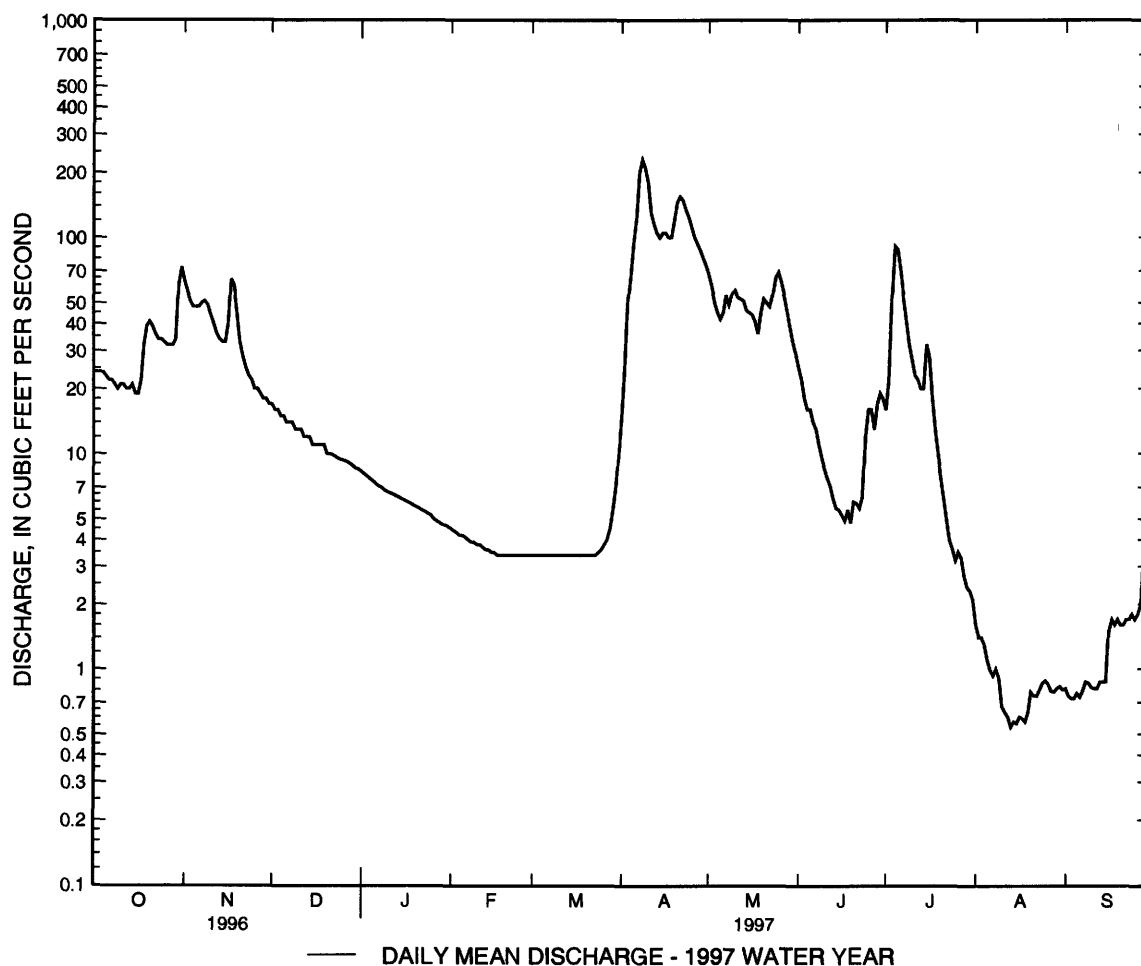
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	47.5	31.5	9.50	4.34	2.74	3.06	107	92.6	9.56	27.9	22.9	12.0
MAX	65.4	37.9	11.7	6.18	3.71	3.87	114	136	11.3	32.5	45.0	22.5
(WY)	1996	1997	1997	1997	1997	1997	1997	1996	1997	1996	1996	1996
MIN	29.6	25.2	7.30	2.50	1.80	2.25	98.9	49.6	7.78	23.3	.85	1.56
(WY)	1997	1996	1996	1996	1996	1996	1996	1997	1996	1997	1997	1997

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1996 - 1997
ANNUAL TOTAL	13097.8	8932.87	
ANNUAL MEAN	35.8	24.5	30.9
HIGHEST ANNUAL MEAN			37.4
LOWEST ANNUAL MEAN			24.5
HIGHEST DAILY MEAN	281	May 1	230a
LOWEST DAILY MEAN	1.8	Feb 1	.54
ANNUAL SEVEN-DAY MINIMUM	1.8	Feb 1	.58
INSTANTANEOUS PEAK FLOW			322
INSTANTANEOUS PEAK STAGE		12.88b	Apr 7
INSTANTANEOUS LOW FLOW		.54	Aug 12
ANNUAL RUNOFF (AC-FT)	25980	17720	22420
ANNUAL RUNOFF (CFSM)	1.13	.77	.97
ANNUAL RUNOFF (INCHES)	15.32	10.45	13.22
10 PERCENT EXCEEDS	82	62	76
50 PERCENT EXCEEDS	19	9.4	13
90 PERCENT EXCEEDS	1.8	.88	1.8

a Estimated.

b Highwater mark; backwater from ice.



LAKE OF THE WOODS BASIN

05131455 NETT LAKE RIVER NEAR NETT LAKE, MN

LOCATION.--Lat 48°06'36", long 93°11'12", in NE¹/₄NE¹/₄ sec. 20, T.65 N., R.22 W., Koochiching County, Hydrologic Unit 09030005, downstream from dam at outlet of Nett Lake, 4 miles west of the town of Nett Lake.

PERIOD OF RECORD.--October 1995 to current year.

GAGE.--Water-stage recorder. Elevation of gage 1,270 ft above mean sea level (from topographic map).

REMARKS.--Records good except those for winter period, which are fair. Regulation from Nett Lake Dam upstream of gage.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	52	e230	e146	e75	e32	e23	e57	662	201	46	.65	.12
2	40	e235	e144	e75	e32	e23	71	653	193	72	.89	.12
3	45	248	e142	e75	e31	e23	e90	595	96	60	1.1	.17
4	49	248	e140	e74	e31	e22	e120	543	7.4	67	1.5	.07
5	46	244	e138	e72	e31	e22	e150	559	9.2	77	.75	.28
6	43	254	e136	e69	e30	e21	e180	628	9.1	96	.94	.09
7	51	256	e134	e67	e30	e21	e200	605	13	102	1.1	.04
8	43	256	e132	e66	e29	e21	e215	543	6.7	111	.58	.03
9	45	e245	e131	e65	e28	e21	e225	543	4.6	105	.24	.02
10	42	e240	e129	e63	e28	e22	e245	522	4.2	101	.09	.13
11	35	e225	e127	e62	e27	e22	e275	482	5.3	97	.49	.17
12	41	e209	e126	e60	e26	e22	e360	474	4.6	98	.38	.03
13	36	e200	e125	e59	e25	e21	478	453	5.4	91	.45	.01
14	58	e195	e123	e57	e24	e21	501	425	2.1	112	.47	.03
15	29	e190	e122	e55	e23	e21	495	408	.54	116	.12	.08
16	32	e190	e121	e54	e21	e21	485	396	1.2	124	.03	.14
17	54	e190	121	e52	e22	e21	474	375	3.8	125	.26	.05
18	56	e188	e118	e50	e22	e21	458	368	5.4	134	.25	.04
19	93	e185	e115	e49	e22	e21	464	345	4.4	134	.09	.01
20	102	e182	e110	e48	e22	e21	472	334	3.0	114	.22	.01
21	100	e179	e105	e47	e23	e21	498	327	2.6	120	.40	.06
22	102	e176	e100	e46	e23	e21	521	321	3.7	111	.57	.02
23	105	e172	e95	e45	e23	e21	514	310	6.6	104	.16	.05
24	104	e169	e92	e43	e23	e21	500	313	14	96	.34	.10
25	114	e166	e88	e41	24	e21	482	317	10	97	.03	.12
26	113	e162	e85	e39	e24	e22	465	298	15	101	.22	.07
27	86	e158	e83	e38	e24	e23	459	275	20	98	.28	.05
28	105	e154	e80	e36	e23	e27	499	265	33	97	.15	.17
29	144	e151	e78	e35	---	e32	586	246	35	73	.27	.01
30	159	e148	e77	e34	---	e40	640	226	41	41	.30	.01
31	e215	---	e76	e33	---	e48	---	214	---	18	.24	---
TOTAL	2339	6045	3539	1684	723	728	11179	13025	760.84	2938	13.56	2.30
MEAN	75.5	202	114	54.3	25.8	23.5	373	420	25.4	94.8	.44	.077
MAX	215	256	146	75	32	48	640	662	201	134	1.5	.28
MIN	29	148	76	33	21	21	57	214	.54	18	.03	.01
AC-FT	4640	11990	7020	3340	1430	1440	22170	25840	1510	5830	27	4.6
CFM	.59	1.57	.89	.42	.20	.18	2.91	3.28	.20	.74	.00	.00
IN.	.68	1.76	1.03	.49	.21	.21	3.25	3.79	.22	.85	.00	.00

e Estimated

LAKE OF THE WOODS BASIN

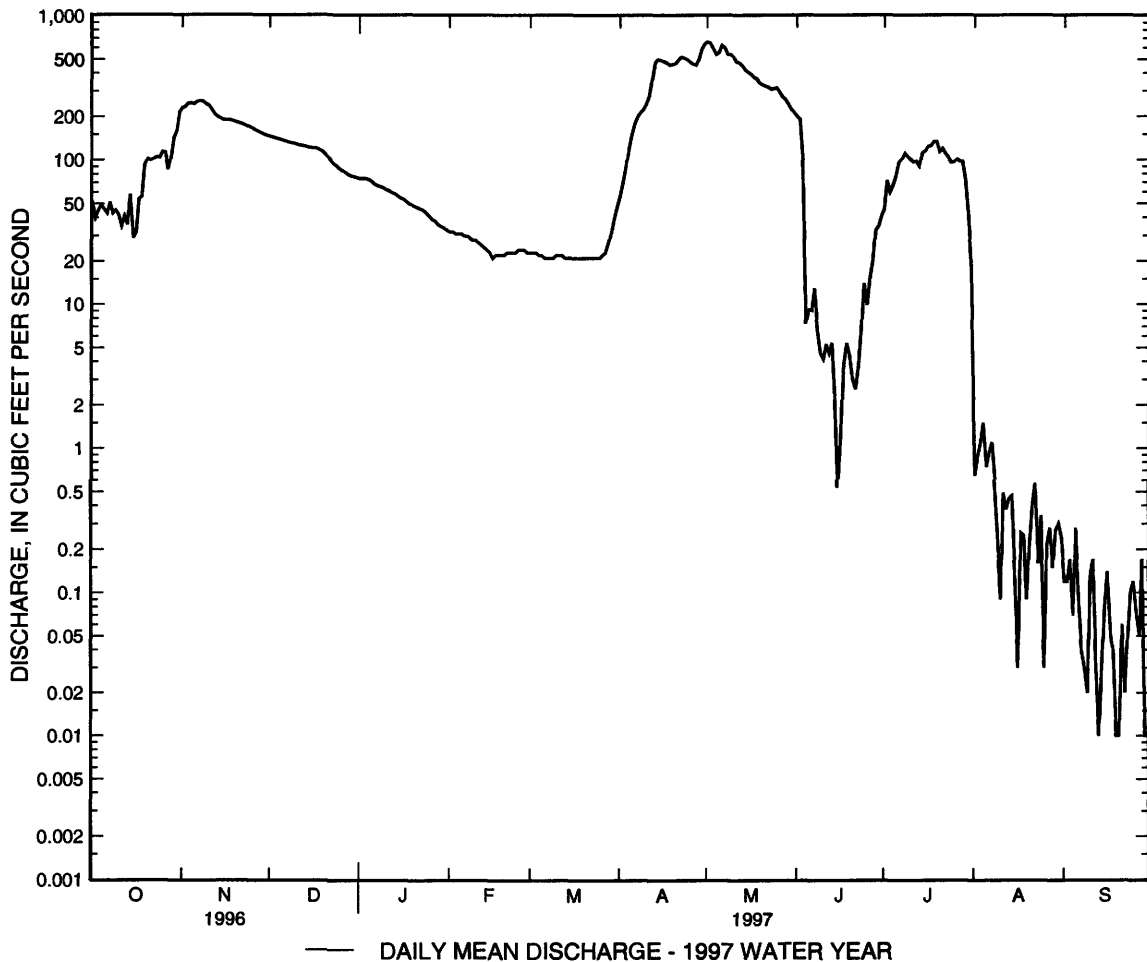
05131455 NETT LAKE RIVER NEAR NETT LAKE, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	114	173	96.0	53.1	31.6	25.5	294	466	57.5	48.1	1.45	6.17
MAX	153	202	114	54.3	37.3	27.5	373	512	89.6	94.8	2.45	12.3
(WY)	1996	1997	1997	1997	1996	1996	1997	1996	1996	1997	1996	1996
MIN	75.5	144	77.9	52.0	25.8	23.5	215	420	25.4	1.41	.44	.077
(WY)	1997	1996	1996	1996	1997	1997	1996	1997	1997	1996	1997	1997

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1996 - 1997
ANNUAL TOTAL	40976.30	42976.70	
ANNUAL MEAN	112	118	114
HIGHEST ANNUAL MEAN			118
LOWEST ANNUAL MEAN			111
HIGHEST DAILY MEAN	661	May 3	662
LOWEST DAILY MEAN	.00	Jun 21	.01
ANNUAL SEVEN-DAY MINIMUM	.00	Aug 13	.03
INSTANTANEOUS PEAK FLOW			681
INSTANTANEOUS PEAK STAGE			5.15
ANNUAL RUNOFF (AC-FT)	81280	85240	82780
ANNUAL RUNOFF (CFSM)	.87	.92	.89
ANNUAL RUNOFF (INCHES)	11.91	12.49	12.13
10 PERCENT EXCEEDS	379	363	366
50 PERCENT EXCEEDS	42	55	48
90 PERCENT EXCEEDS	.48	.20	.27

a Many days in 1996.



LAKE OF THE WOODS BASIN

05131500 LITTLE FORK RIVER AT LITTLEFORK, MN

LOCATION.--Lat 48°23'45", long 93°32'57", in NE¼SE¼ sec. 9, T.68 N., R.25 W., Koochiching County, Hydrologic Unit 09030005, on right bank at town of Littlefork, 0.9 mi upstream from bridge on State Highway 217, 2.8 mi upstream from Beaver Creek, and 19 mi upstream from mouth.

DRAINAGE AREA.--1,730 mi², approximately.

PERIOD OF RECORD.--June to November 1909, April to November 1910, April 1911 to June 1917, September 1917, October 1917 to March 1919 (gage heights only), June 1928 to current year.

REVISED RECORDS.--WSP 955: Drainage area. WSP 1508: 1913, 1916, 1928-32, 1934. WRD MN-74: 1963.

GAGE.--Water-stage recorder. Datum of gage is 1,083.59 ft above sea level. June 23, 1909 to Mar. 4, 1917, nonrecording gage and July 21, 1937 to Oct. 23, 1979, water-stage recorder at site 1.2 mi downstream at datum 10.53 ft lower; Mar. 5 to Sept. 30, 1917, and June 22, 1928 to July 20, 1937, non-recording gage at site 1.18 mi downstream at datum 10.53 ft lower.

REMARKS.--Records good except those for estimated daily discharges, which are poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	591	4240	e1220	e490	e310	e220	e600	4040	1290	1590	401	169
2	633	3950	e1190	e480	e300	e220	e900	3720	1150	1680	360	159
3	614	3510	e1160	e470	e300	e220	e1500	3400	1030	2420	324	149
4	565	3210	e1120	e460	e290	e220	e2500	3090	941	3760	295	143
5	524	2780	e1080	e450	e290	e220	e4000	2790	794	4320	270	139
6	501	2540	e1040	e440	e280	e220	e6000	2610	750	3970	276	134
7	473	2610	e1000	e430	e280	e220	e9000	2480	761	3590	270	129
8	447	2800	e960	e430	e280	e220	e11000	2510	745	3030	245	125
9	433	2820	e930	e420	e270	e220	e12400	2600	668	2440	240	120
10	420	2630	e900	e410	e270	e220	e11000	2550	600	1890	229	116
11	397	2270	e870	e400	e270	e220	e10000	2490	528	1480	210	115
12	378	1940	e840	e400	e260	e220	e9100	2400	466	1200	205	115
13	365	e1870	e810	e390	e260	e220	e8000	2300	417	1200	191	115
14	351	e1830	e780	e390	e260	e220	e7700	2190	386	1490	179	118
15	346	e1790	e750	e380	e250	e220	e8400	2160	348	1430	175	120
16	343	e1900	e730	e380	e250	e220	e9500	2220	311	1620	180	119
17	370	e2650	e700	e370	e250	e220	e7000	2160	277	1610	168	126
18	527	e3400	e680	e360	e250	e220	e6000	2020	268	1510	161	138
19	1230	e3750	e660	e360	e240	e220	5720	1960	261	1220	158	176
20	1780	e3650	e640	e350	e240	e220	6280	2390	259	979	168	302
21	1940	e3050	e620	e350	e240	e220	6530	2820	265	833	176	298
22	1840	e2500	e600	e340	e240	e220	6480	2690	277	761	184	272
23	1660	e2100	e590	e340	e230	e220	6160	2440	270	715	203	251
24	1510	e1800	e570	e330	e230	e224	5740	2680	296	659	238	240
25	1410	e1650	e560	e330	e230	e225	5320	3340	612	609	237	226
26	1360	e1530	e550	e330	e220	e225	4890	3240	1740	574	228	212
27	1360	e1450	e540	e320	e220	e230	4530	2860	1900	545	219	200
28	1480	e1360	e530	e320	e220	e260	4510	2390	1810	525	211	222
29	1570	e1320	e520	e320	---	e300	4490	1970	1670	524	205	233
30	2260	e1280	e510	e320	---	e350	4290	1680	1560	506	195	296
31	4180	---	e500	e315	---	e450	---	1470	---	456	183	---
TOTAL	31858	74180	24150	11875	7230	7324	189540	79660	22650	49136	6984	5277
MEAN	1028	2473	779	383	258	236	6318	2570	755	1585	225	176
MAX	4180	4240	1220	490	310	450	12400	4040	1900	4320	401	302
MIN	343	1280	500	315	220	220	600	1470	259	456	158	115
AC-FT	63190	147100	47900	23550	14340	14530	376000	158000	44930	97460	13850	10470
CFSM	.59	1.43	.45	.22	.15	.14	3.65	1.49	.44	.92	.13	.10
IN.	.69	1.60	.52	.26	.16	.16	4.08	1.71	.49	1.06	.15	.11

e Estimated

LAKE OF THE WOODS BASIN

05131500 LITTLE FORK RIVER AT LITTLEFORK, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1997, BY WATER YEAR (WY)

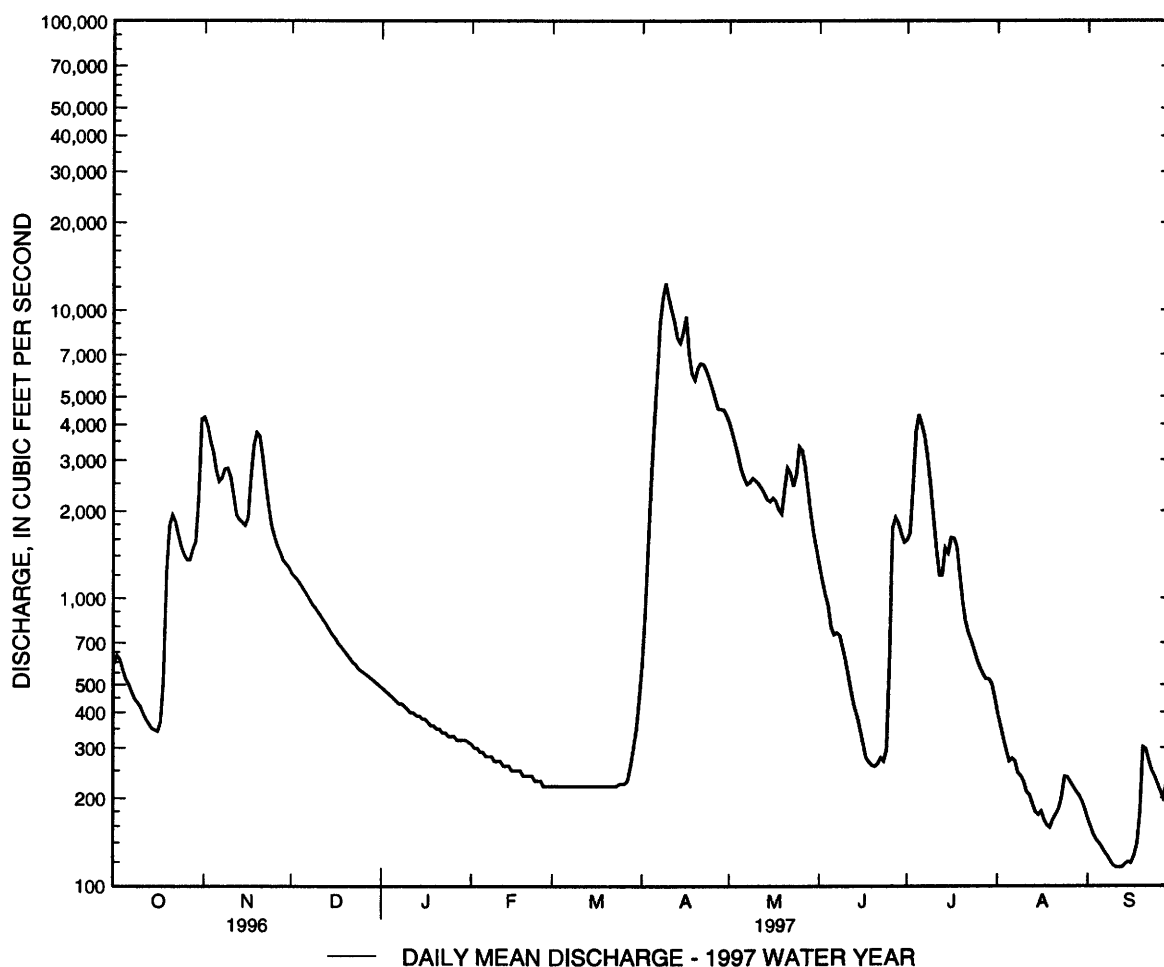
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	909	719	313	149	113	277	3201	2886	1758	985	549	736
MAX	4450	3044	972	477	271	3022	8421	12190	5490	3643	2679	5189
(WY)	1996	1972	1983	1966	1969	1945	1966	1950	1944	1944	1988	1977
MIN	43.4	60.8	52.6	43.5	42.3	50.2	292	173	182	75.4	34.3	27.2
(WY)	1977	1977	1977	1931	1963	1940	1977	1977	1988	1988	1936	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1909 - 1997
ANNUAL TOTAL	506735	509864	
ANNUAL MEAN	1385	1397	1065
HIGHEST ANNUAL MEAN			1912
LOWEST ANNUAL MEAN			306
HIGHEST DAILY MEAN	14300	Apr 23	12400 ^a Apr 9
LOWEST DAILY MEAN	162	Sep 21	115 Sep 11
ANNUAL SEVEN-DAY MINIMUM	165	Sep 20	117 Sep 10
INSTANTANEOUS PEAK FLOW			25000 ^b
INSTANTANEOUS PEAK STAGE		19.34 ^c Apr 9	37.00 ^b Apr 18
INSTANTANEOUS LOW FLOW		112 Sep 16	21 Aug 26
ANNUAL RUNOFF (AC-FT)	1005000	1011000	771400
ANNUAL RUNOFF (CFSM)	.80	.81	.62
ANNUAL RUNOFF (INCHES)	10.90	10.96	8.36
10 PERCENT EXCEEDS	3680	3610	2800
50 PERCENT EXCEEDS	531	524	364
90 PERCENT EXCEEDS	206	211	85

a Estimated.

b Also occurred May 11, 1950, site and datum then in use.

c Backwater from ice.



LAKE OF THE WOODS BASIN

05133500 RAINY RIVER AT MANITOU RAPIDS, MN
(International Gaging Station)

LOCATION.--Lat 48°38'04", long 93°54'47", in NW¹/₄SE¹/₄ sec. 36, T.160 N., R.26 W., Koochiching County, Hydrologic Unit 09030004, on left bank at Manitou Rapids, 4 mi west of Indus.

DRAINAGE AREA.--19,400 mi², approximately.

PERIOD OF RECORD.--July 1928 to current year. Monthly discharge only for some periods, published in WSP 1308. October 1911 to October 1924 (gage height only) at site near Birchdale in files of U.S. Army Corps of Engineers. Published as "near Birchdale" 1932-34.

GAGE.--Water-stage recorder. Datum of gage is 1,062.48 ft above sea level. Prior to Nov. 10, 1934, nonrecording gage at site near Birchdale, 7 mi. downstream at different datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Satellite telemeter at station. Diurnal fluctuation caused by power plant at International Falls. Some regulation at low and medium flows by Rainy and Namakan Lakes.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10000	21300	e26400	e14200	e14100	e8000	e7000	29600	12300	9980	9870	4930
2	11500	21900	e25900	e14600	e13900	e7000	e7300	28300	11500	10200	8790	4910
3	12400	21500	e25700	e14600	e14000	e6420	e8000	27400	12200	14600	7090	4540
4	12500	21000	e23700	e14600	e13900	e7480	e10500	26600	15200	19500	6320	4730
5	10900	20500	e24500	e14600	e14100	e8450	e15500	26000	16100	21800	6170	4820
6	8750	20800	e25300	e14600	e13900	e8740	e22500	25800	16200	22000	6350	4880
7	8730	21600	e25300	e14200	e13800	e8650	e31000	26400	17000	21600	6290	4860
8	9940	21900	e25200	e14500	e13900	e8750	e40000	26200	17600	21200	6260	4820
9	10100	22000	e25000	e14400	e14000	e7360	36600	25900	17400	19400	5990	4810
10	9920	21700	e24200	e14400	e13800	e7550	32400	25800	15000	16700	5780	4820
11	9880	20700	e23600	e14500	e12500	e8940	30100	25600	13300	15100	5640	4790
12	10400	18600	e23600	e14400	e11500	e9660	29000	25500	12300	12700	5210	4780
13	10200	17600	e22700	e14300	e11500	e9920	29000	25200	10300	10100	5210	4770
14	9190	17100	e21900	e14100	e11400	e9790	28900	24000	9320	9460	5430	4780
15	8320	16800	e21900	e14500	e11300	e10200	33300	22600	8830	10400	5200	4800
16	9210	17000	e21800	e14300	e11300	e9430	36200	21900	8680	11000	5120	4750
17	9900	17800	e21600	e14300	e11400	e9910	37100	21700	7980	11600	4990	4690
18	10200	20500	e20300	e14200	e11300	e11100	37700	21400	7760	13600	4930	4730
19	9890	23000	e18100	e14200	e11300	e11000	37900	21200	8480	14900	4820	4820
20	9530	e22800	e18700	e13600	e11300	e10800	37300	21200	9620	14000	4740	4960
21	11600	e26000	e17200	e13400	e11600	e10900	37900	21500	9730	11300	4790	5100
22	15700	e26500	e16300	e13700	e10200	e10800	38200	21600	8710	9550	4860	5160
23	16400	e26100	e16300	e14200	e8740	e12000	37900	21700	8690	8820	4900	5180
24	16500	e26000	e16200	e14200	e8890	e11900	37200	22800	10600	7620	4950	5090
25	16300	e25200	e16100	e14000	e9650	e11700	36300	23500	10700	7340	5090	5100
26	16100	e25300	e16100	e14100	e9520	e11000	35400	24100	12200	7640	5110	5050
27	16100	e25100	e16100	e14100	e9480	e10100	34500	23800	14500	7060	5100	4980
28	16100	e25500	e15400	e14200	e9420	e9560	33800	22500	12500	7630	5070	5160
29	16400	e26400	e15800	e14000	---	e7270	32200	20500	10400	9360	5010	5300
30	17500	e26200	e16000	e13800	---	e7420	31300	18100	9990	10100	4960	5290
31	19400	---	e15600	e13900	---	e7790	---	14700	---	10200	4960	---
TOTAL	379560	664400	642500	440700	331700	289590	902000	733100	355090	396460	175000	147400
MEAN	12240	22150	20730	14220	11850	9342	30070	23650	11840	12790	5645	4913
MAX	19400	26500	26400	14600	14100	12000	40000	29600	17600	22000	9870	5300
MIN	8320	16800	15400	13400	8740	6420	7000	14700	7760	7060	4740	4540
AC-FT	752900	1318000	1274000	874100	657900	574400	1789000	1454000	704300	786400	347100	292400
CFSM	.63	1.14	1.07	.73	.61	.48	1.55	1.22	.61	.66	.29	.25
IN.	.73	1.27	1.23	.85	.64	.56	1.73	1.41	.68	.76	.34	.28

e Estimated

LAKE OF THE WOODS BASIN

05133500 RAINY RIVER AT MANITOU RAPIDS, MN--Continued

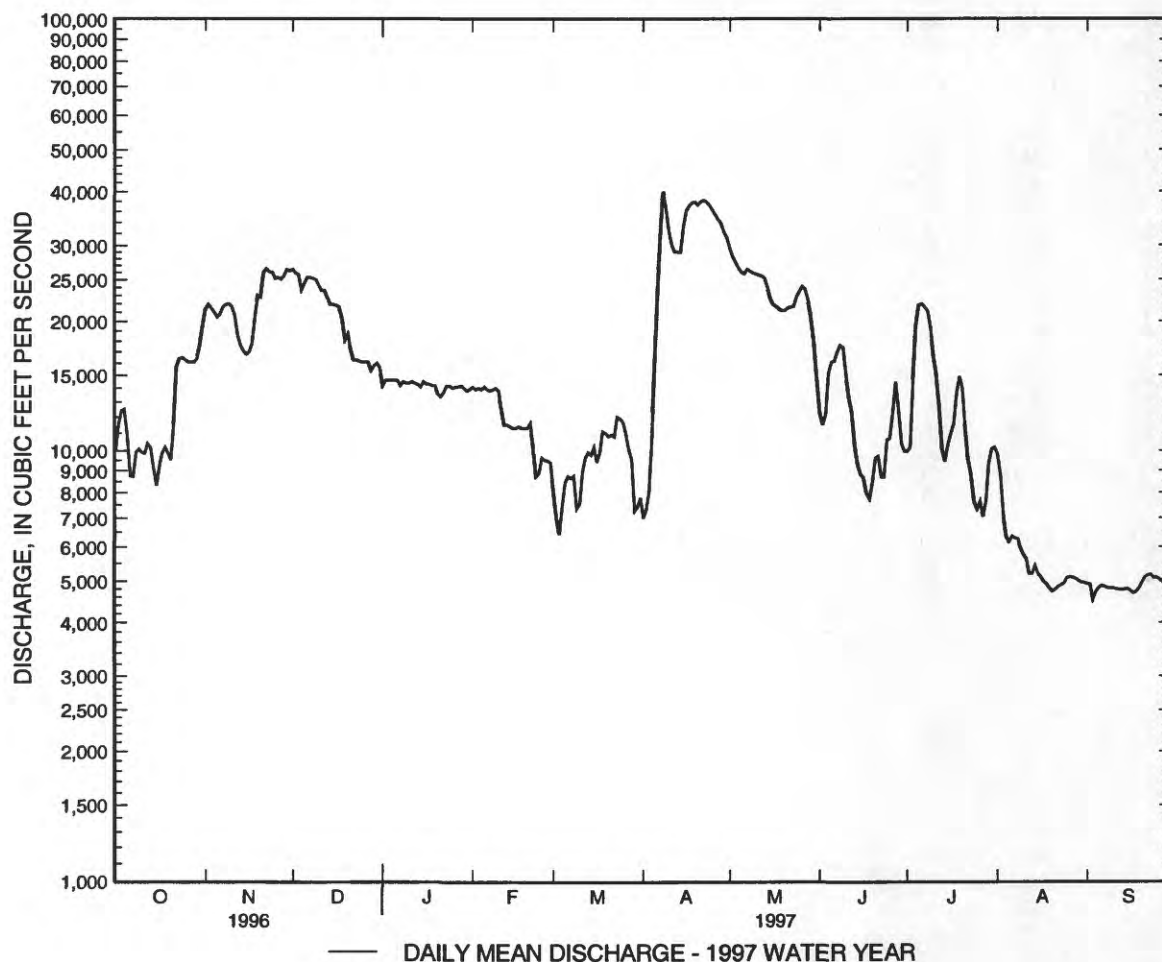
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	12050	11490	10320	9232	8781	9026	15570	19700	20020	16620	11440	11150
MAX	42410	37280	27790	18430	17240	16640	38100	52880	49480	47970	33700	30620
(WY)	1942	1972	1972	1972	1969	1945	1966	1950	1950	1950	1944	1988
MIN	4728	3796	3190	2900	3129	2926	4378	4106	3676	3483	3422	4168
(WY)	1981	1977	1930	1931	1931	1931	1977	1977	1980	1980	1980	1958

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1929 - 1997
ANNUAL TOTAL	7195410	5457500	
ANNUAL MEAN	19660	14950	12960
HIGHEST ANNUAL MEAN			23260
LOWEST ANNUAL MEAN			4470
HIGHEST DAILY MEAN	46400	May 21	40000 ^a Apr 8
LOWEST DAILY MEAN	6760	Apr 9	4540 Sep 3
ANNUAL SEVEN-DAY MINIMUM	6790	Apr 4	4760 Sep 12
INSTANTANEOUS PEAK FLOW			40500 Apr 9
INSTANTANEOUS PEAK STAGE			17.50 ^b Nov 26
ANNUAL RUNOFF (AC-FT)	14270000	10820000	9391000
ANNUAL RUNOFF (CFMS)	1.01	.77	.67
ANNUAL RUNOFF (INCHES)	13.80	10.46	9.08
10 PERCENT EXCEEDS	38500	26000	25500
50 PERCENT EXCEEDS	16100	13800	10400
90 PERCENT EXCEEDS	8530	5100	5040

a Estimated.

b From highwater mark, backwater from ice.



LAKE OF THE WOODS BASIN

05140521 LAKE OF THE WOODS AT SPRINGSTEEL ISLAND NEAR WARROAD, MN

LOCATION.--Lat 48°56'45", long 95°18'24", in SW 1/4 SW 1/4 sec. 9, T. 163 N., R. 36 W., Roseau County, Hydrologic Unit 09030009, at Springsteel Resort on Springsteel Island, 2.8 mi north of Warroad.

DRAINAGE AREA.--27,200 mi².

PERIOD OF RECORD.--June 1985 to current year.

GAGE.--Water-stage recorder. Datum at gage is 1,000.00 ft above sea level, Lake of the Woods datum.

REMARKS.--Satellite telemeter at station. Water level subject to fluctuation caused by changes in direction and velocity of wind and seiches.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 62.24 ft, July 5, 1989; maximum daily, 61.81 ft, July 6, 7, 1985; minimum, 57.22 ft, Nov. 22, 1990; minimum daily, 57.43 ft, Mar. 18, 19, 20, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 60.82 ft, Oct. 1; maximum daily, 60.57 ft, Oct. 1; minimum, 57.95 ft, Apr. 2; minimum daily, 57.97 ft, Apr. 3.

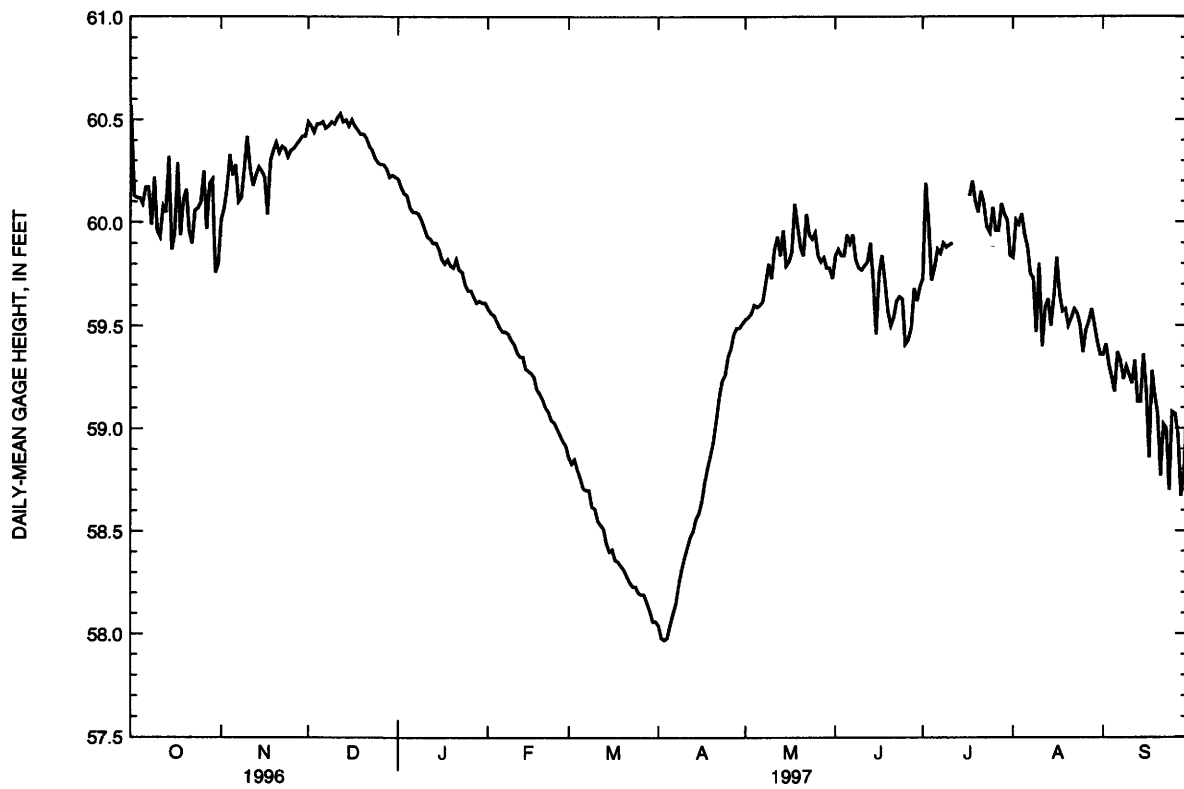
GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	60.57	60.01	60.49	60.21	59.58	58.86	58.04	59.53	59.84	59.73	59.83	59.36
2	60.13	60.07	60.47	60.17	59.56	58.83	57.98	59.54	59.87	60.19	60.01	59.41
3	60.12	60.17	60.44	60.14	59.55	58.85	57.97	59.56	59.84	59.99	59.89	59.31
4	60.12	60.33	60.48	60.13	59.52	58.80	57.98	59.60	59.84	59.72	60.04	59.25
5	60.09	60.23	60.48	60.07	59.49	58.76	58.04	59.59	59.94	59.78	59.84	59.18
6	60.17	60.28	60.49	60.05	59.47	58.71	58.10	59.60	59.90	59.87	59.88	59.37
7	60.17	60.10	60.46	60.05	59.47	58.70	58.15	59.62	59.94	59.85	59.75	59.33
8	59.99	60.12	60.47	60.04	59.46	58.70	58.24	59.71	59.82	59.90	59.73	59.24
9	60.22	60.26	60.49	60.01	59.43	58.62	58.31	59.80	59.78	59.88	59.47	59.30
10	59.96	60.42	60.48	59.97	59.41	58.61	58.37	59.73	59.77	59.89	59.80	59.26
11	59.93	60.26	60.51	59.93	59.37	58.55	58.42	59.87	59.79	59.90	59.40	59.22
12	60.08	60.18	60.53	59.92	59.35	58.53	58.47	59.93	59.81	---	59.59	59.33
13	60.05	60.23	60.49	59.90	59.35	58.51	58.50	59.84	59.90	---	59.63	59.13
14	60.32	60.27	60.50	59.90	59.29	58.44	58.56	59.96	59.71	---	59.50	59.13
15	59.87	60.25	60.47	59.87	59.28	58.40	58.59	59.79	59.46	---	59.64	59.36
16	59.95	60.22	60.50	59.82	59.27	58.41	58.65	59.81	59.75	---	59.83	59.19
17	60.29	60.04	60.47	59.80	59.25	58.36	58.74	59.86	59.84	60.13	59.65	58.86
18	59.94	60.30	60.45	59.82	59.19	58.35	58.81	60.09	59.71	60.20	59.57	59.28
19	60.11	60.35	60.43	59.79	59.17	58.33	58.87	59.98	59.57	60.10	59.58	59.16
20	60.16	60.39	60.43	59.78	59.14	58.31	58.94	59.88	59.50	60.05	59.50	59.07
21	59.96	60.34	60.41	59.82	59.10	58.28	59.04	59.84	59.54	60.15	59.54	58.77
22	59.90	60.37	60.37	59.77	59.08	58.25	59.15	60.04	59.62	60.09	59.58	59.02
23	60.06	60.36	60.35	59.76	59.04	58.23	59.23	59.94	59.64	59.98	59.56	59.00
24	60.07	60.32	60.31	59.70	59.03	58.23	59.26	59.92	59.63	59.95	59.50	58.70
25	60.10	60.35	60.29	59.67	59.00	58.20	59.35	59.95	59.41	60.07	59.37	59.08
26	60.25	60.36	60.28	59.67	58.97	58.19	59.39	59.84	59.43	59.96	59.48	59.07
27	59.97	60.38	60.28	59.64	58.94	58.19	59.46	59.81	59.49	59.96	59.52	58.97
28	60.19	60.40	60.26	59.61	58.92	58.15	59.49	59.83	59.68	60.09	59.58	58.67
29	60.21	60.42	60.22	59.62	---	58.11	59.49	59.78	59.62	60.04	59.50	58.77
30	59.76	60.42	60.23	59.61	---	58.06	59.51	59.78	59.69	60.01	59.42	59.07
31	59.80	---	60.22	59.61	---	58.06	---	59.73	---	59.84	59.36	---
MEAN	60.08	60.27	60.41	59.87	59.27	58.44	58.70	59.80	59.71	---	59.64	59.13
MAX	60.57	60.42	60.53	60.21	59.58	58.86	59.51	60.09	59.94	---	60.04	59.41
MIN	59.76	60.01	60.22	59.61	58.92	58.06	57.97	59.53	59.41	---	59.36	58.67

LAKE OF THE WOODS BASIN

05140521 LAKE OF THE WOODS AT SPRINGSTEEL ISLAND NEAR WARROAD, MN--Continued



UPPER MISSISSIPPI RIVER BASIN

05200510 MISSISSIPPI RIVER NEAR BEMIDJI, MN

LOCATION.--Lat 47°29'00", long 94°43'40", in SE¹/₄SW¹/₄ sec. 3, T.146 N., R.32 W., Beltrami County, Hydrologic Unit 07010101, 3.5 mi east of Bemidji on right bank 100 ft upstream of County Highway 12 and 400 ft downstream from Stump Lake dam.

DRAINAGE AREA.--610 mi², approximately.

PERIOD OF RECORD.--September 1987 to current year (no winter records).

GAGE.--Water-stage recorder. Elevation of gage is 1,315 ft above sea level from topographic map.

REMARKS.--Records good except those for estimated daily discharge, which are fair.. Flow regulated by Stump Lake dam upstream from station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	109	---	---	---	---	---	329	739	e335	224	579	298
2	137	---	213	---	---	---	329	721	e340	327	557	294
3	128	---	---	---	---	---	329	e640	340	433	573	290
4	112	---	---	---	---	---	330	e580	e390	501	537	248
5	105	---	---	---	---	---	332	551	e380	503	531	225
6	95	---	---	---	---	---	336	638	381	504	424	223
7	97	---	---	---	---	---	417	e520	e370	896	334	219
8	98	---	---	---	---	---	580	e630	e360	1260	319	210
9	98	---	---	---	---	---	791	633	e355	1190	318	230
10	144	---	---	---	---	---	887	e640	e350	980	325	228
11	153	---	---	---	---	---	886	e650	e340	944	320	226
12	141	---	---	---	---	---	945	658	332	1110	311	225
13	137	---	---	104	---	---	1030	658	e270	1060	311	224
14	132	---	---	---	---	---	1120	668	e230	1320	377	223
15	159	---	---	---	---	---	1200	532	e190	1260	375	225
16	183	---	---	---	---	---	1240	541	156	1250	375	221
17	188	---	---	---	---	---	1260	416	140	1210	375	249
18	197	---	---	---	---	---	1290	e400	98	1190	372	242
19	189	---	---	---	---	---	1270	e380	96	1150	372	242
20	189	---	---	---	---	---	1250	e360	93	1140	374	247
21	177	---	---	---	---	---	1230	e340	91	1110	374	246
22	176	---	---	---	---	---	1210	332	89	1030	371	246
23	160	---	---	---	---	---	1170	e330	85	1040	279	244
24	145	---	---	---	---	---	1150	e330	104	953	279	243
25	---	---	---	---	---	---	1120	e330	166	950	275	237
26	---	---	---	---	---	---	1080	e330	153	971	294	234
27	---	---	---	---	---	329	1040	e330	132	958	307	234
28	---	---	---	---	---	329	1010	e330	127	873	302	247
29	---	---	---	---	---	329	809	332	151	736	301	262
30	---	---	---	---	---	329	711	e330	159	600	301	270
31	---	---	---	---	---	329	---	e330	---	599	298	---
TOTAL	3449	---	213	104	---	1645	26681	15199	6803	28272	10860	7252
MEAN	144	---	213	104	---	329	889	490	227	912	350	242
MAX	197	---	213	104	---	329	1290	739	390	1320	579	298
MIN	95	---	213	104	---	329	329	330	85	224	275	210
AC-FT	6840	---	422	206	---	3260	52920	30150	13490	56080	21540	14380
CFSM	.24	---	.35	.17	---	.54	1.46	.80	.37	1.50	.57	.40
IN.	.21	---	.01	.01	---	.10	1.63	.93	.41	1.72	.66	.44

e Estimated

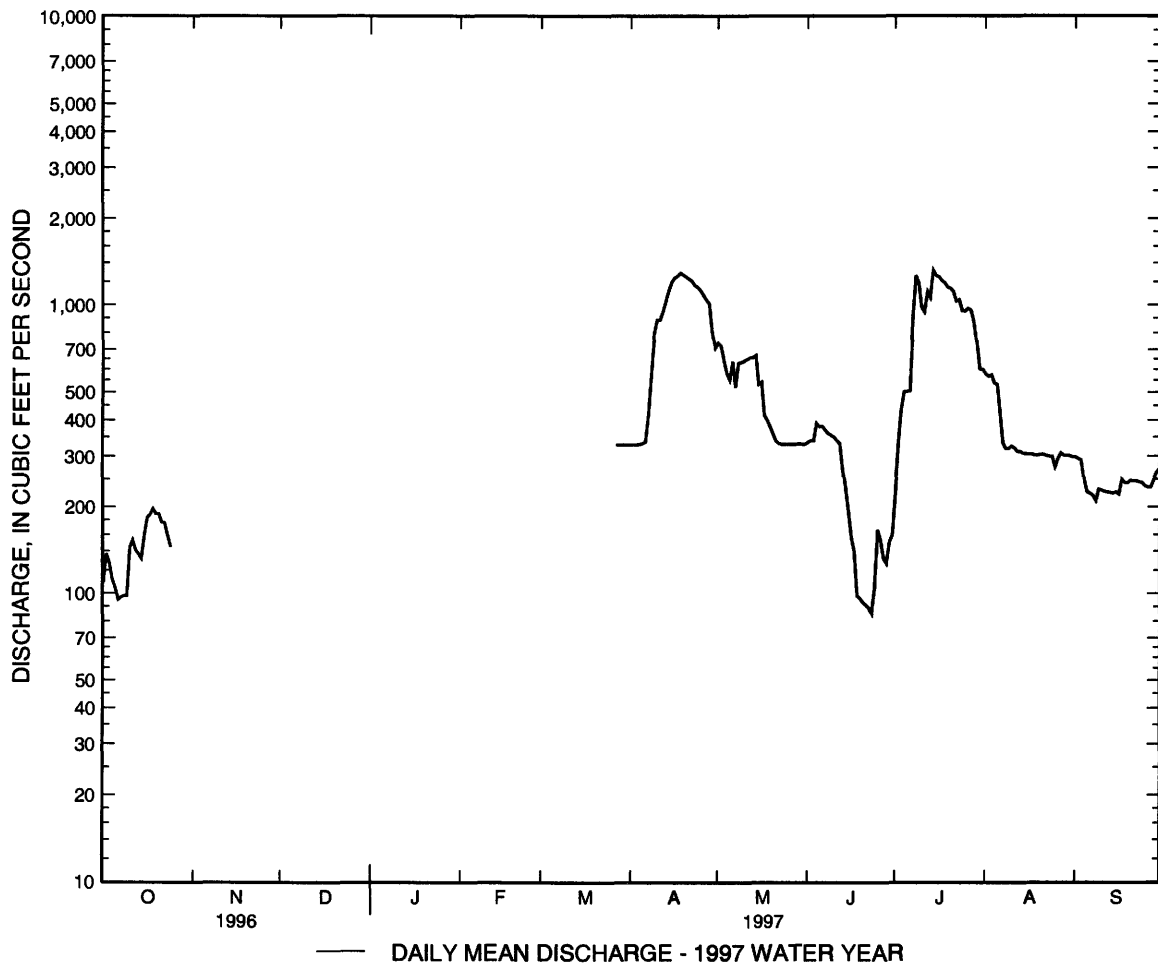
UPPER MISSISSIPPI RIVER BASIN

05200510 MISSISSIPPI RIVER NEAR BEMIDJI, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	179	---	---	---	---	242	372	416	226	280	195	194
MAX	311	---	---	---	---	242	889	769	329	912	471	401
(WY)	1995	---	---	---	---	1996	1997	1996	1993	1997	1993	1993
MIN	75.5	---	---	---	---	242	148	181	104	62.2	61.9	62.3
(WY)	1991	---	---	---	---	1996	1992	1992	1988	1988	1989	1990

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1987 - 1997		
HIGHEST DAILY MEAN	1190	Apr 30	1320	Jul 14	1320	Jul 14	1997
LOWEST DAILY MEAN	88	Aug 19	85	Jun 23	22	Jul 12	1998
INSTANTANEOUS PEAK FLOW			1820	Jul 11	1820	Jul 11	1997
INSTANTANEOUS PEAK STAGE			5.98	Jul 11	5.98	Jul 11	1997



UPPER MISSISSIPPI RIVER BASIN

05201000 WINNIBIGOSHISH LAKE NEAR DEER RIVER, MN

LOCATION.--Lat 47°25'42", long 94°03'00", in sec. 25, T.146 N., R.27 W., Itasca County, Hydrologic Unit 07010101, on Leech Lake Indian Reservation, at dam on Mississippi River, 1 mi northwest of Little Winnibigoshish Lake, 14 mi northwest of city of Deer River, and at mile 1,248 upstream from Ohio River.

DRAINAGE AREA.--1,442 mi².

PERIOD OF RECORD.--April 1884 to current year. Prior to October 1941 monthend contents only, published in WSP 1308. Published as Winnibigoshish Reservoir near Deer River October 1941 to September 1956.

REVISED RECORDS.--WSP 1308: 1905(M).

GAGE.--Water-stage recorder. Datum of gage is in mean sea level (levels by U.S. Army Corps of Engineers). Prior to July 8, 1949, nonrecording gage at same site, and July 9, 1949 to July 10, 1973, water-stage recorder at same site and at datum of 1,288.94 ft above mean sea level.

REMARKS.--Reservoir is formed by Winnibigoshish Lake and several other natural lakes controlled by a concrete and timber dam, completed in 1884; storage began in 1884. Capacity between elevations 1,294.94 ft and 1,303.14 ft (maximum allowable range) is 668,737 acre-ft of which 439,636 acre-ft is controlled storage between elevations 1,294.94 ft and 1,300.94 ft (normal operating range). Contents shown herein are contents above elevation 1,286.00 ft. Prior to September 1978, published contents as contents above elevation 1,288.94 ft. Water is used to benefit navigation on Mississippi River below Minneapolis.

COOPERATION.--Records were provided by U.S. Army Corps of Engineers.

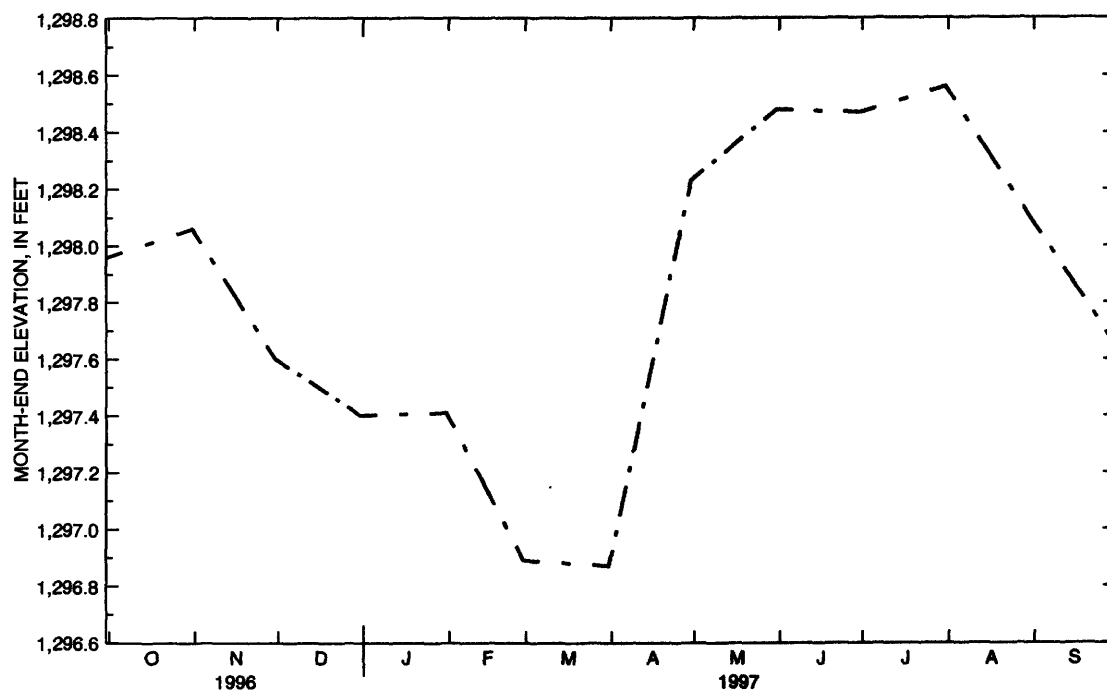
EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 996,500 acre-ft, capacity table then in use, July 30, 1905, elevation, 1,303.39 ft; minimum observed, 33,680 acre-ft, below zero of capacity table then in use, Oct. 20, 1931, elevation, 1,288.25 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 729,400 acre-ft, July 27, elevation, 1,298.64 ft; minimum, 613,300 acre-ft, Mar. 31, elevation, 1,296.87 ft.

MONTH-END ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	1297.96	684800	
Oct. 31	1298.06	691300	+6500
Nov. 30	1297.60	661100	-30200
Dec. 31	1297.40	648000	-13100
CAL YR 1996			-21700
Jan. 31	1297.41	630900	-17100
Feb. 28	1296.89	614600	-16300
Mar. 31	1296.87	613300	-1300
Apr. 30	1298.23	702500	+89200
May 31	1298.48	718900	+16400
June 30	1298.47	718200	-700
July 31	1298.56	724100	+5900
Aug. 31	1298.09	693300	-30800
Sept. 30	1297.65	664400	-28900
WTY YR 1997			-20400

UPPER MISSISSIPPI RIVER BASIN
05201000 WINNIBIGOSHISH LAKE NEAR DEER RIVER, MN--Continued



LEECH LAKE RIVER BASIN

05206000 LEECH LAKE AT FEDERAL DAM, MN

LOCATION (REVISED).--Lat 47°10'14", long 94°17'12", in SE¹/₄SE¹/₄ sec. 25, T.143 N., R.29 W., Cass County, Hydrologic Unit 07010102, on Leech Lake Indian Reservation, at head of Leech Lake River, 1 mi. northeast of Battle Point, 6 mi southwest of town of Federal Dam.

DRAINAGE AREA.--1,163 mi².

PERIOD OF RECORD.--April 1884 to current year. Monthend contents only for some periods, published in WSP 1308. Prior to October 1956, published as "Leech Lake Reservoir."

GAGE.--Water-stage recorder. Datum of gage is in mean sea level (levels by U.S. Army Corps of Engineers). Prior to Dec. 31, 1884, nonrecording gage 0.5 mi north of outlet to Leech Lake River at datum 98.47 ft higher. Dec. 31, 1884 to May 24, 1931, nonrecording gage 0.5 mi north of outlet to Leech Lake River and May 25, 1931 to July 10, 1973, water-stage recorder at same site and at datum 92.70 ft higher.

REMARKS.--Reservoir is formed by Leech Lake and several other natural lakes controlled by concrete and timber dam; storage began in 1884; original timber structure completed in 1884, replaced by present dam in 1902. Capacity between elevation 1,292.70 ft and 1,297.94 ft (maximum allowable range) is 688,985 acre-ft of which 352,637 acre-ft is controlled storage between elevations 1,292.70 ft and 1,295.70. Reservoir is formed by Leech Lake and several other natural lakes controlled by concrete and timber dam; storage began in 1884; original timber structure completed in 1884, replaced by present dam in 1902. Capacity between elevation 1,292.70 ft and 1,297.94 ft (maximum allowable range) is 688,985 acre-ft of which 352,637 acre-ft is controlled storage between elevations 1,292.70 ft and 1,295.70 ft (normal operating range). Contents shown herein are contents above elevation 1,290.00 ft. Prior to September 1978, published contents as contents above elevation 1,292.20 ft. Water is used to benefit navigation on Mississippi River below Minneapolis.

COOPERATION.--Records were provided by U.S. Army Corps of Engineers.

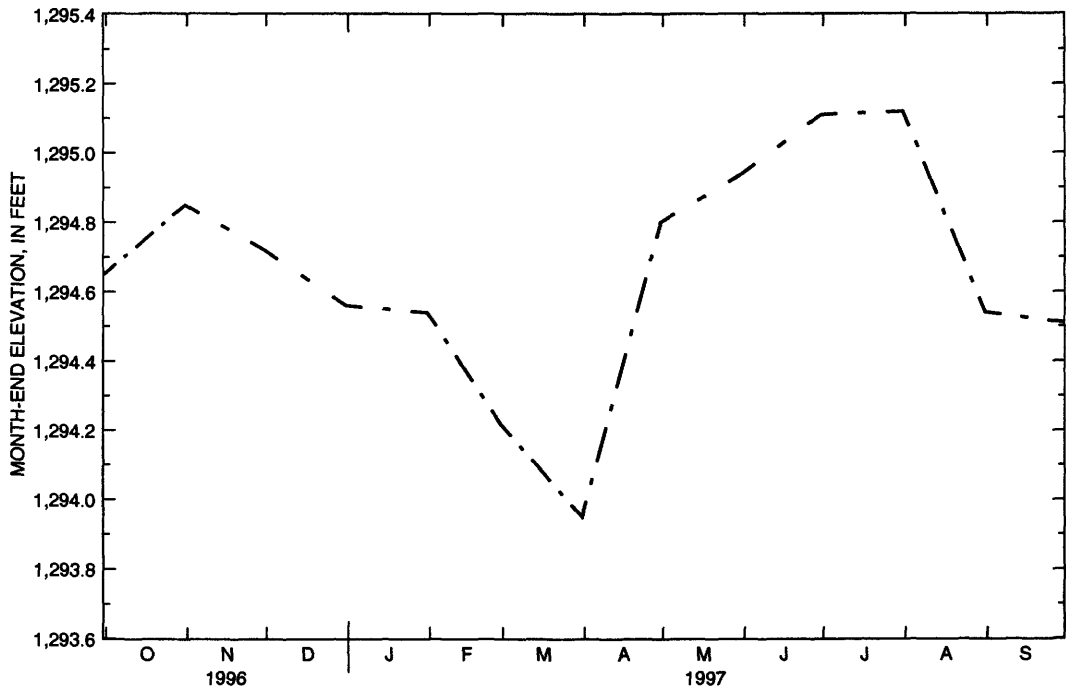
EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 734,300 acre-ft, capacity table then in use, June 30, 1916, elevation, 1,297.88 ft; minimum, 51,380 acre-ft, capacity table then in use, Dec. 8, 24, 1976, elevation, 1,292.69 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 658,400 acre-ft, July 14, elevation, 1295.29 ft; minimum, 488,100 acre-ft, Mar. 28, elevation, 1,293.94 ft.

MONTH-END ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	1294.65	577500	
Oct. 31	1294.85	602800	+25300
Nov. 30	1294.72	586300	-16500
Dec. 31	1294.56	566100	-20200
CAL YR 1996			-20200
Jan. 31	1294.54	563600	-2500
Feb. 28	1294.22	523100	-40500
Mar. 31	1293.95	489300	-33800
Apr. 30	1294.80	596400	+107100
May 31	1294.94	614100	+17700
June 30	1295.11	635600	+21500
July 31	1295.12	636600	+1000
Aug. 31	1294.54	563600	-73000
Sept. 30	1294.51	559800	-3800
WTR YR 1997			-17700

LEECH LAKE RIVER BASIN
 05206000 LEECH LAKE AT FEDERAL DAM, MN--Continued



UPPER MISSISSIPPI RIVER BASIN

05210500 POKEGAMA LAKE NEAR GRAND RAPIDS, MN

LOCATION.--Lat 47°10'00", long 93°33'20", in NW¹/₄ sec. 17, T.54 N., R.25 W., Itasca County, Hydrologic Unit 07010101, at narrows on U.S. Highway 169, 4 mi south of Grand Rapids and at mile 1,184 upstream from Ohio River.

DRAINAGE AREA.--3,265 mi².

PERIOD OF RECORD.--April 1884 to current year. Prior to October 1941 monthend contents only, published in WSP 1308. Published as Pokegama Reservoir near Grand Rapids, October 1941 to September 1956.

REVISED RECORDS.--WSP 1914: 1897(M).

GAGE.--Water-stage recorder. Datum of gage is in mean sea level (levels by U.S. Army Corps of Engineers). Prior to May 30, 1949, no recording gage at Pooles Arm of Pokegama Lake 5 mi northwest, and May 31, 1949 to July 12, 1973, water-stage recorder at same site and at datum 64.47 ft higher.

REMARKS.--Reservoir is formed by Pokegama Lake and several other natural lakes controlled by concrete dam; storage began in 1884; original timber dam completed in 1884, replaced by present structure in 1888-89. Capacity between elevation 1,270.42 ft and 1,276.42 ft (maximum allowable range) is 80,126 acre-ft of which 52,483 acre-ft is controlled storage between elevations 1,270.42 ft and 1,274.42 ft (normal operating range). Contents shown herein are contents above elevation 1,267.00 ft. Prior to September 1978, published contents as contents above elevation 1,268.92 ft. Water is used to benefit navigation on Mississippi River below Minneapolis.

COOPERATION.--Records were provided by U.S. Army Corps of Engineers.

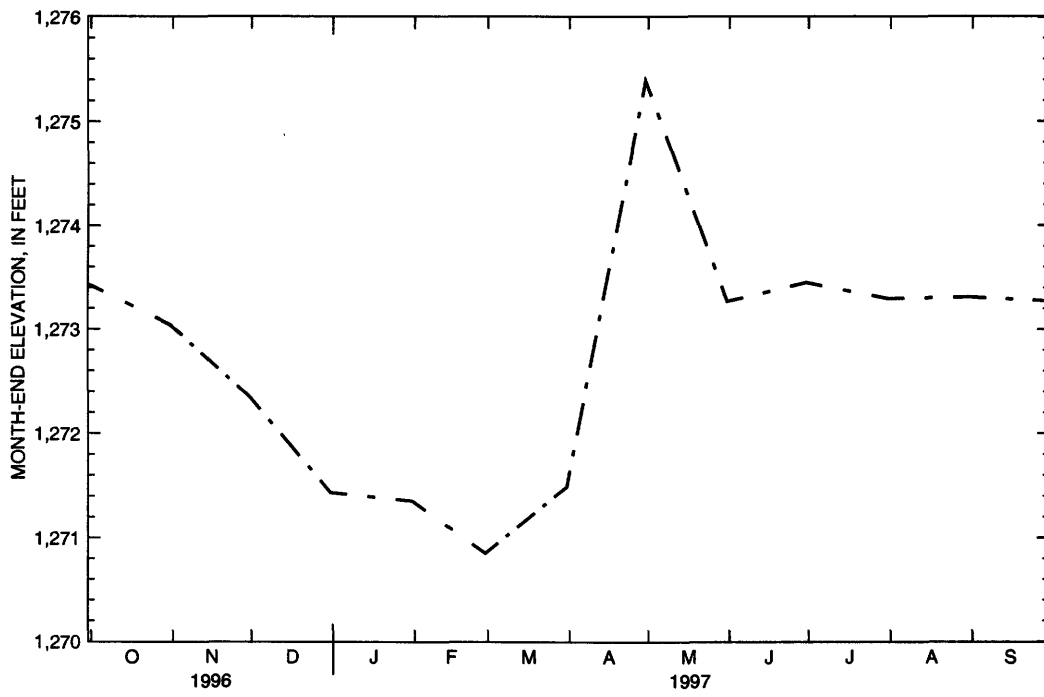
EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 153,200 acre-ft, May 1, 1996, elevation, 1,276.22 ft; maximum elevation, 1,277.92 ft, May 8, 1897; minimum contents observed, 4,520 acre-ft, below zero of capacity table then in use, Sept. 30, 1934, elevation, 1,268.54 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 149,400 acre-ft, Apr. 21, elevation, 1,276.05 ft; minimum, 59,500 acre-ft, May 12, elevation, 1,270.73 ft.

MONTH-END ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	1273.43	98050	
Oct. 31	1273.04	92180	-5870
Nov. 30	1272.35	81930	-10250
Dec. 31	1271.43	68840	-13090
CAL YR 1996			-4830
Jan. 31	1271.35	67760	-1080
Feb. 28	1270.85	61090	-6670
Mar. 31	1271.49	69680	+8590
Apr. 30	1275.39	134400	+64720
May 31	1273.27	95620	-38780
June 30	1273.45	98380	+2760
July 31	1273.30	96070	-2310
Aug. 31	1273.31	96220	+150
Sept. 30	1273.27	95620	-600
WTR YR 1997			-2430

UPPER MISSISSIPPI RIVER BASIN
05210500 POKEGAMA LAKE NEAR GRAND RAPIDS, MN--Continued



UPPER MISSISSIPPI RIVER BASIN

05211000 MISSISSIPPI RIVER AT GRAND RAPIDS, MN

LOCATION.--Lat 47°13'56", long 93°31'48", in SW¹/₄NW¹/₄ sec. 21, T.55 N., R.25 W., Itasca County, Hydrologic Unit 07010103, on left bank, in super-calendar room of Blandin Paper Mill in Grand Rapids, 400 ft downstream from Blandin Dam, 400 ft upstream from bridge on U.S. Highway 169, 2.5 mi upstream from Prairie River, and at mile 1,182 upstream from Ohio River.

DRAINAGE AREA.--3,370 mi², approximately.

PERIOD OF RECORD.--October 1883 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as "at Pokegama Dam near Grand Rapids" 1942-44.

GAGE.--Water-stage recorder. Datum of gage is 1,242.03 ft above mean sea level. See WSP 1914 for history of changes prior to Jan. 17, 1951.

REMARKS.--Records fair. Flow regulated by Winnibigoshish Lake (station 05201000), Leech Lake (station 05206000), Pokegama Lake (station 05210500) and occasionally at low flow by power plant at Blandin Dam. Backwater from Prairie River occurs at times in most years.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	607	2040	e2640	e2260	e2290	e2400	2630	2980	1990	2110	2650	2200
2	877	2350	e2650	e2200	e2280	e2390	2590	3040	2020	2210	2560	2160
3	828	2380	e2700	e2200	e2270	e2380	2640	3050	2050	2230	2530	2180
4	751	2350	e2690	e2200	e2450	e2380	2180	2960	1960	2470	2630	2160
5	799	2380	e2680	e2220	e2430	e2360	870	2890	2010	2500	2670	2170
6	753	2550	e2630	e2220	e2410	e2330	757	2930	1940	2560	2550	2190
7	775	2560	e2600	e2200	e2410	e2330	561	2910	1950	2610	2580	2200
8	752	e2550	e2590	e2190	e2380	e2330	625	2880	2020	2750	2510	2140
9	697	e2540	e2600	e2190	e2380	e2310	e900	2790	1880	2770	2560	2180
10	779	e2530	e2640	e2180	e2380	e2290	e1800	2770	1780	2730	2580	2190
11	841	e2530	e2750	e2170	e2430	2280	e2320	2740	1860	2730	2460	2230
12	911	e2520	e2740	e2170	e2410	2250	e2530	2520	1770	2670	2350	2170
13	896	e2510	e2730	e2170	e2410	2230	e2800	2280	1720	2770	2310	2180
14	897	e2600	e2740	e2170	e2410	2270	e3000	2170	1620	2820	1960	2160
15	899	e2480	e2740	e2170	e2410	2320	e2950	2180	1630	3030	2030	2170
16	885	e2490	e2730	e2170	e2410	2360	e2900	2180	1610	3060	2110	2280
17	1120	e2490	e2730	e2150	e2370	2380	2870	2120	1570	3170	2050	2360
18	1260	e2500	e2730	e2150	e2330	2280	2760	2090	1700	3260	2190	2270
19	1420	e2520	e2720	e2160	e2420	2240	2420	2180	1590	3120	2390	2240
20	1410	e2540	e2690	e2160	e2400	2230	2390	2310	1620	3000	2570	2210
21	1450	e2700	e2640	e2160	e2400	2230	2510	2280	1610	2930	2510	2200
22	1370	e2680	e2620	e2220	e2400	2230	2710	2180	1550	2820	2480	2290
23	1440	e2680	e2590	e2220	e2380	2270	2750	2100	1730	2730	2460	2270
24	1670	e2670	e2530	e2220	e2380	2270	2750	2090	1800	2720	2470	2170
25	1780	e2630	e2480	e2220	e2400	2290	2860	2140	1980	2710	2590	2300
26	1790	e2600	e2400	e2220	e2400	2280	2900	2120	2180	2720	2500	2180
27	1800	e2600	e2340	e2210	e2400	2340	2930	2060	2190	2730	2470	2200
28	1720	e2600	e2300	e2210	e2400	2410	3010	2050	1970	2810	2420	2230
29	1800	e2620	e2270	e2210	---	2540	3080	2030	2010	2820	2260	2230
30	1880	e2640	e2270	e2210	---	2650	3070	2060	2110	2820	2120	2230
31	1820	---	e2270	e2380	---	2640	---	2050	---	2650	2190	---
TOTAL	36677	75830	80430	68180	66840	72490	71063	75130	55420	85030	74710	66340
MEAN	1183	2528	2595	2199	2387	2338	2369	2424	1847	2743	2410	2211
MAX	1880	2700	2750	2380	2450	2650	3080	3050	2190	3260	2670	2360
MIN	607	2040	2270	2150	2270	2230	561	2030	1550	2110	1960	2140
AC-FT	72750	150400	159500	135200	132600	143800	141000	149000	109900	168700	148200	131600
CFSM	.35	.75	.77	.65	.71	.69	.70	.72	.55	.81	.72	.66
IN.	.40	.84	.89	.75	.74	.80	.78	.83	.61	.94	.82	.73

e Estimated

UPPER MISSISSIPPI RIVER BASIN

05211000 MISSISSIPPI RIVER AT GRAND RAPIDS, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1432	1586	1486	1494	1498	1412	1226	1315	1331	1425	1275	1254
MAX	2865	2528	2595	2410	2729	2762	3442	3026	3271	3363	3711	3542
(WY)	1986	1997	1997	1952	1945	1945	1945	1979	1962	1962	1950	1950
MIN	187	174	186	168	177	198	247	32.5	206	125	98.3	195
(WY)	1977	1977	1977	1977	1977	1977	1959	1949	1988	1961	1961	1976

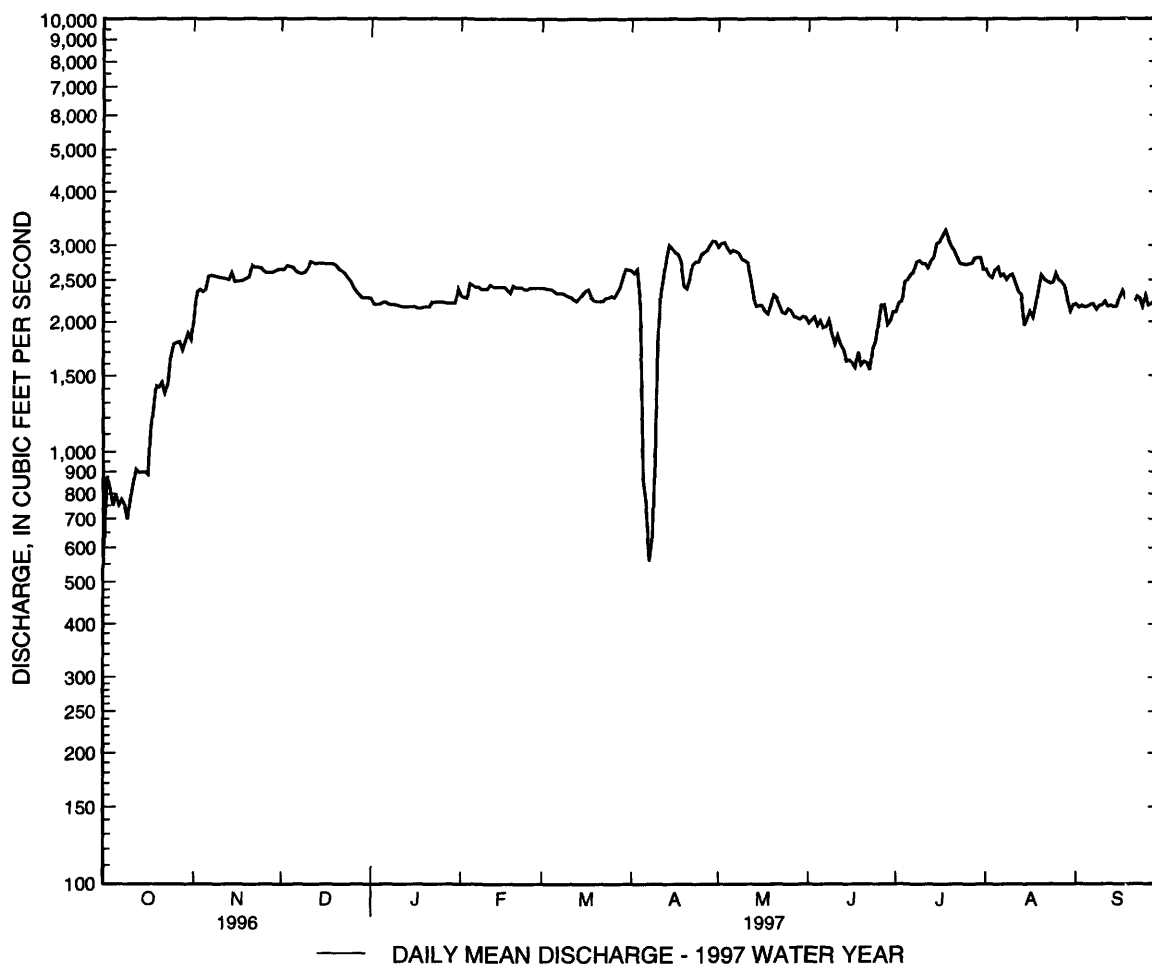
SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1942 - 1997
ANNUAL TOTAL	701527	828140	
ANNUAL MEAN	1917	2269	1394 _a
HIGHEST ANNUAL MEAN			2269
LOWEST ANNUAL MEAN			277
HIGHEST DAILY MEAN	3410	May 7	4610
LOWEST DAILY MEAN	414	Sep 12	.00
ANNUAL SEVEN-DAY MINIMUM	482	Sep 11	24
INSTANTANEOUS PEAK FLOW		3360	Jul 18
INSTANTANEOUS PEAK STAGE		10.18 _c	Apr 13
INSTANTANEOUS LOW FLOW		495 _e	Oct 1
10 PERCENT EXCEEDS	2690	2750	2360
50 PERCENT EXCEEDS	2160	2320	1400
90 PERCENT EXCEEDS	632	1650	365

a Average based on 114 years of record is 1210 ft³/s; median of annual mean discharges is 1100 ft³/s.b From rating curve extended above 4500 ft³/s.

c Backwater from Prairie River.

d From floodmark; caused by dam failure.

e Result of regulation.



SANDY RIVER BASIN

05218500 BIG SANDY LAKE AT LIBBY, MN

LOCATION.--Lat 46°47'20", long 93°19'10", in sec. 25, T.50 N., R.24 W., Aitkin County, Hydrologic Unit 07010103, on dam on Sandy River at Libby, 1.2 mi upstream from mouth, and 14 mi north of McGregor.

DRAINAGE AREA.--421 mi².

PERIOD OF RECORD.--July to December 1893, October to December 1894, July 1895 to current year. Monthend contents only for some periods, published in WSP 1308. Published as Sandy Lake Reservoir at Libby, October 1941 to September 1956; and Sandy Lake at Libby, October 1956 to September 1995..

GAGE.--Water-stage recorder. Datum of gage is in mean sea level (levels by U.S. Army Corps of Engineers). Prior to Sept. 23, 1949, nonrecording gage and Sept. 24, 1949 to Nov. 28, 1962, water-stage recorder at site 1 mi upstream at datum 1,207.71 ft, adjustment of 1912. Nov. 29, 1962 to June 30, 1973, water-stage recorder at present site at datum 1,207.71 ft, adjustment of 1912.

REMARKS.--Lake is formed by concrete dam which controls Sandy, Flowage, Snake, and Aitkin Lakes. Storage began in 1893; original timber crib dam completed in 1895, replaced by present structure in 1911. Capacity between elevation 1,214.31 ft and 1,221.31 ft (top of structure) is 73,037 acre-ft, of which 37,539 acre-ft is controlled storage between elevations 1,214.31 ft and 1,218.31 ft (normal operating range). Contents shown herein are contents above elevation 1,207.00 ft. Prior to September 1978, published contents as contents above elevation 1,209.03 ft. Water is used to benefit navigation on Mississippi River below Minneapolis.

COOPERATION.--Records were provided by U.S. Army Corps of Engineers.

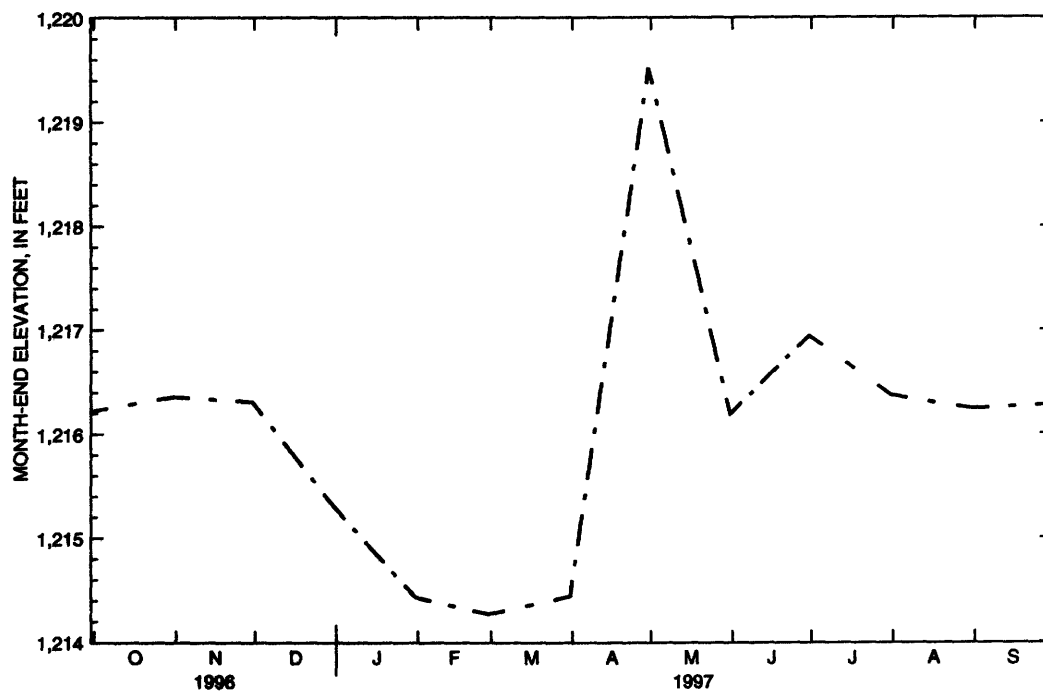
EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 167,200 acre-ft, capacity table then in use, May 19, 1950, elevation, 1,224.82 ft; minimum observed, 5,950 acre-ft, below zero of capacity table then in use, Jan. 20, 1921, elevation, 1,207.96 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 101,200 acre-ft, Apr. 22, elevation, 1,220.01 ft; minimum, 43,480 acre-ft, Mar. 20, elevation, 1,214.20 ft.

MONTH-END ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	1216.22	61070	
Oct. 31	1216.36	62390	+1320
Nov. 30	1216.31	61910	-480
Dec. 31	1215.30	52740	-9170
CAL YR 1996.....			+3870
Jan. 31	1214.43	45350	-7390
Feb. 28	1214.27	44040	-1310
Mar. 31	1214.44	45440	+1400
Apr. 30	1219.52	95370	+49930
May 31	1216.19	60790	-34580
June 30	1216.94	67960	+7170
July 31	1216.37	62480	-5480
Aug. 31	1216.24	61260	-1220
Sept. 30	1216.28	61630	+370
WTR YR 1997.....			+560

SANDY RIVER BASIN
05218500 BIG SANDY LAKE AT LIBBY, MN--Continued



UPPER MISSISSIPPI RIVER BASIN

05227500 MISSISSIPPI RIVER AT AITKIN, MN

LOCATION.--Lat 46°32'26", long 93°42'26", in SW¹/₄NW¹/₄ sec. 24, T.47 N., R.27 W., Aitkin County, Hydrologic Unit 07010104, on right bank upstream side of highway bridge at north edge of Aitkin, 1 mi downstream from Ripple River and at mile 1,055.9 upstream from Ohio River.

DRAINAGE AREA.--6,140 mi², approximately.

PERIOD OF RECORD.--March 1945 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,182.41 ft above sea level (levels by U.S. Army Corps of Engineers). Mar. 1, 1945 to Mar. 14, 1961, nonrecording gage, and Mar. 15, 1961 to Sept. 30, 1967, water-stage recorder at same site at datum 3.0 ft higher. Diversion channel: Non-recording gage and crest-stage gage. Datum of gage is 1,182.02 ft above sea level. Apr. 9, 1955 to Apr. 10, 1956, nonrecording gage at site 4 mi downstream at different datum. Apr. 11, 1956 to Sept. 30, 1967, non-recording gage at same site at datum 3.0 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Flow regulated by Winnibigoshish Lake (sta 05201000), Leech Lake (sta 05206000), Pokegama Lake (sta 05210500), and Sandy Lake (sta 05218500). Water diverted at medium and high stages into Aitkin diversion channel 6.5 mi above station, bypasses station and returns to river 15.5 mi below station. Diversion began Apr. 2, 1955. These records include flow in diversion channel. Gage height telemeter and U.S. Army Corps of Engineers satellite telemeter at station.

EXTREMES FOR CURRENT YEAR.--Main channel: Maximum discharge, 6450 ft³/s, Apr. 16; maximum gage height, 16.26 ft., Apr. 7. Diversion channel: Maximum discharge, 5650 ft³/s, Apr. 16; maximum gage height, 16.76 ft., Apr. 7.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1510	4630	e5000	e3500	e3050	e3000	e4300	9430	4170	5630	4590	2610
2	1550	4740	e5000	e3450	e3050	e3000	e5000	9170	4020	5900	4470	2520
3	1520	4830	e5000	e3450	e3050	e3000	e6600	8930	3850	6160	4340	2490
4	1520	4960	e5000	e3400	e3050	e3000	e8000	8620	3650	6500	4200	2450
5	1570	5080	e5000	e3350	e3050	e3000	e10000	8370	3530	6740	4020	2430
6	1590	5200	e4950	e3300	e3050	e3000	e11000	8060	3440	6780	3840	2420
7	1560	5320	e4950	e3300	e3050	e3000	e11500	7770	3370	6760	3690	2410
8	1530	5430	e4950	e3250	e3050	e3000	e11400	7570	3300	6830	3560	2410
9	1500	5470	e4950	e3200	e3000	e3000	11300	7430	3210	6880	3450	2420
10	1480	5430	e4900	e3200	e3000	e3000	11100	7180	3130	6780	3360	2400
11	1460	5280	e4900	e3150	e3000	e2980	10900	7080	3050	6610	3240	2380
12	1450	5080	e4850	e3150	e3000	e3000	11500	6960	2930	6450	3160	2370
13	1470	4600	e4780	e3150	e3000	e3000	11700	6760	2810	6460	3110	2370
14	1490	4070	e4800	e3150	e3000	e3000	11700	6620	2700	6760	3030	2360
15	1520	e3900	e4800	e3100	e3000	e3000	11900	6410	2650	6850	2950	2350
16	1520	e3980	e4750	e3100	e3000	e3000	12000	6210	2610	6700	2860	2350
17	1630	e4500	e4700	e3100	e3000	e3000	12000	5920	2540	6380	2700	2370
18	1790	e4900	e4600	e3100	e3000	e3000	11900	5730	2470	6010	2590	2410
19	2070	e4850	e4500	e3100	e3000	e3000	11300	5630	2400	5710	2560	2560
20	2410	e4800	e4400	e3100	e3000	e3000	11300	5490	2390	5560	2590	2800
21	2720	e4750	e4350	e3100	e3000	e3000	11200	5260	2380	5450	2650	2900
22	3010	e4800	e4200	e3070	e3000	e3050	11100	5120	2360	5350	2750	2810
23	3230	e4850	e4100	e3050	e3000	e3050	11000	5090	2370	5220	2840	2730
24	3330	e4900	e4000	e3050	e3000	e3100	10800	5120	2450	5040	2930	2660
25	3380	e4950	e3900	e3050	e3000	e3100	10600	5070	2960	5020	2960	2640
26	3500	e5000	e3850	e3050	e3000	e3150	10500	5020	3480	5210	2940	2610
27	3670	e5000	e3750	e3050	e3000	e3250	10300	4940	3660	5270	2900	2590
28	3740	e5000	e3700	e3050	e3000	e3300	10100	4850	3760	5120	2870	2610
29	3830	e5000	e3650	e3050	---	e3400	9900	4710	4600	4930	2850	2590
30	4110	e5000	e3600	e3050	---	e3500	9710	4520	5290	4770	2800	2600
31	4400	---	e3550	e3050	---	e3800	---	4330	---	4670	2720	---
TOTAL	71060	146300	139430	98220	84400	95680	311610	199370	95530	184500	99520	75620
MEAN	2292	4877	4498	3168	3014	3086	10390	6431	3184	5952	3210	2521
MAX	4400	5470	5000	3500	3050	3800	12000	9430	5290	6880	4590	2900
MIN	1450	3900	3550	3050	3000	2980	4300	4330	2360	4670	2560	2350
AC-FT	140900	290200	276600	194800	167400	189800	618100	395500	189500	366000	197400	150000
CFSM	.37	.79	.73	.52	.49	.50	1.69	1.05	.52	.97	.52	.41
IN.	.43	.89	.84	.60	.51	.58	1.89	1.21	.58	1.12	.60	.46

e Estimated

UPPER MISSISSIPPI RIVER BASIN

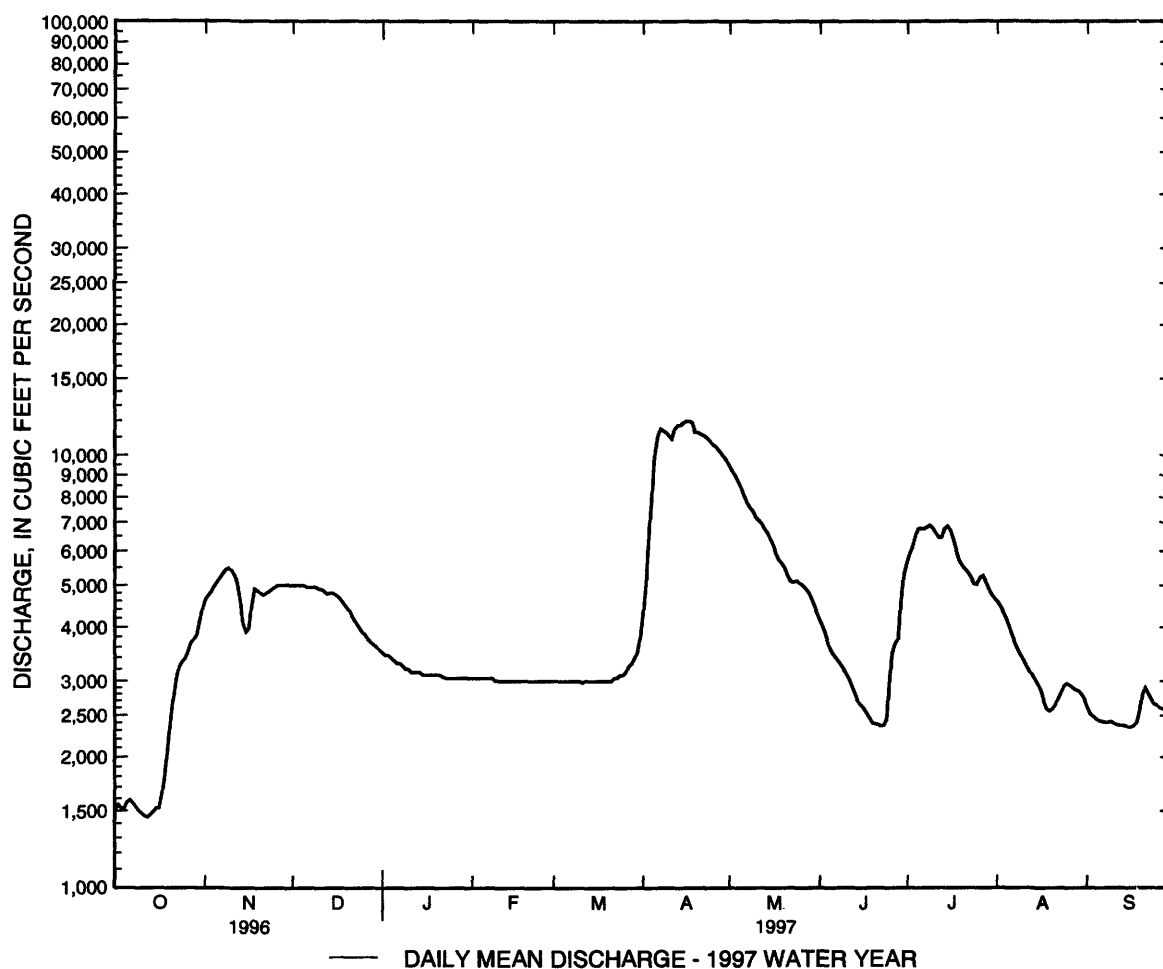
05227500 MISSISSIPPI RIVER AT AITKIN, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	2661	2740	2245	1954	1868	2242	5234	5314	3660	3080	2334	2224
MAX	6534	6756	4498	3525	3196	5415	10830	15510	8072	8201	8270	6689
(WY)	1966	1972	1997	1966	1966	1945	1966	1950	1965	1993	1953	1986
MIN	313	328	324	345	398	638	1074	669	540	346	273	321
(WY)	1977	1977	1977	1977	1977	1977	1977	1958	1988	1961	1961	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR			FOR 1997 WATER YEAR			WATER YEARS 1945 - 1997		
ANNUAL TOTAL	1459054			1601240					
ANNUAL MEAN	3986			4387			2955		
HIGHEST ANNUAL MEAN							4985		
LOWEST ANNUAL MEAN							796		
HIGHEST DAILY MEAN	11700			Apr 30	12000	Apr 16,17	19900	May 20	1950
LOWEST DAILY MEAN	987			Sep 25	1450	Oct 12	153	Sep 1	1961
ANNUAL SEVEN-DAY MINIMUM	998			Sep 21	1480	Oct 9	195	Aug 26	1961
INSTANTANEOUS PEAK FLOW					12000	Apr 16	20000	May 20	1950
INSTANTANEOUS PEAK STAGE					16.26a	Apr 7	22.49	May 20	1950
INSTANTANEOUS LOW FLOW					1450	Oct 11	151	Sep 1	1961
ANNUAL RUNOFF (AC-FT)	2894000			3176000			2141000		
ANNUAL RUNOFF (INCHES)	8.84			9.70			6.54		

a Backwater from ice.



PINE RIVER BASIN

05230500 PINE RIVER RESERVOIR (CROSS LAKE) AT CROSS LAKE, MN

LOCATION.--Lat 46°40'09", long 94°06'44", in SW¹/₄NW¹/₄ sec. 21, T.137 N., R.27 W., Crow Wing County, Hydrologic Unit 07010105, at dam on Pine River, at outlet of Cross Lake at city of Cross Lake.

DRAINAGE AREA.--562 mi².

PERIOD OF RECORD.--March 1886 to current year. Monthend contents only for some periods, published in WSP 1308.

GAGE.--Water-stage recorder. Datum of gage is in mean sea level (levels by U.S. Army Corps of Engineers). Prior to May 3, 1949, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by Trout, Whitefish, Rush, and Cross Lakes and several other natural lakes controlled by timber crib dam; storage began in 1886; dam completed in 1886. Capacity between elevations 1,226.32 ft and 1,234.82 ft (maximum allowable range) is 118,703 acre-ft of which 57,272 acre-ft is controlled storage between elevations 1,226.32 ft and 1,230.32 ft (normal operating range). Contents shown herein are contents above an elevation 1,216.00 ft. Prior to September 1978, published contents as contents above elevation 1,218.67 ft. Water is used to benefit navigation on Mississippi River below Minneapolis.

COOPERATION.--Records were provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 173,600 acre-ft, capacity table then in use, July 10, 1916, elevation, 1,234.56 ft; minimum observed, 1,310 acre-ft, below zero of capacity table then in use, Aug. 20, 1918, elevation, 1,217.67 ft.

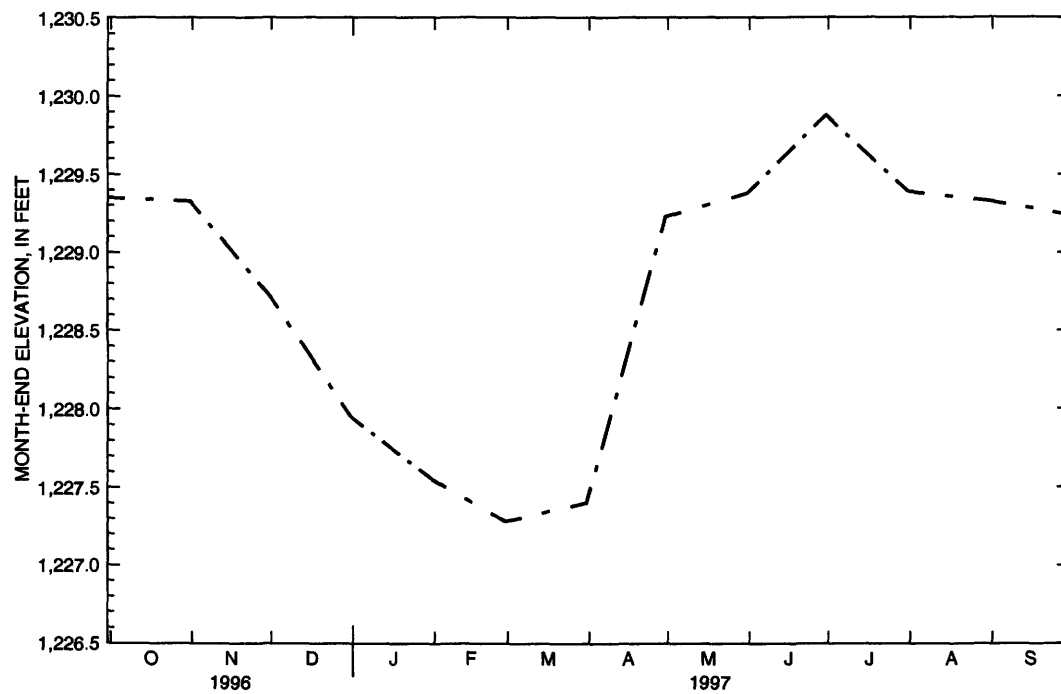
EXTREMES FOR CURRENT YEAR.--Maximum contents, 109,100 acre-ft, June 29, elevation, 1,229.89 ft; minimum, 73,920 acre-ft, Mar. 17, elevation, 1,227.26 ft.

MONTH-END ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

Date	Elevation (feet)	Contents (acre-feet)	Change in content (acre-feet)
Sept. 30	1229.35	101800	
Oct. 31	1229.33	101500	-300
Nov. 30	1228.73	93370	-8130
Dec. 31	1227.95	82980	-10390
CAL YR 1996			-2510
Jan. 31	1227.55	77720	-5260
Feb. 28	1227.28	74180	-3540
Mar. 31	1227.40	75750	+1570
Apr. 30	1229.23	100100	+24350
May 31	1229.38	102200	+2100
June 30	1229.88	109000	+6800
July 31	1229.39	102300	-6700
Aug. 31	1229.33	101500	-800
Sept. 30	1229.24	100300	-1200
WTR YR 1997			-1500

PINE RIVER BASIN

05230500 PINE RIVER RESERVOIR (CROSS LAKE) AT CROSS LAKE, MN--Continued



UPPER MISSISSIPPI RIVER BASIN

05242300 MISSISSIPPI RIVER AT BRAINERD, MN

LOCATION.--Lat 46°22'40", long 94°10'59", in SE $\frac{1}{4}$ /SW $\frac{1}{4}$ sec. 18, T. 145 N., R. 30 W., Crow Wing County, Hydrologic Unit 07010104, on left bank in hydro-plant of Potlatch Corporation, Northwest Paper Division in Brainerd, 12.7 mi upstream from Crow Wing River, and at mile 1003.7 upstream from Ohio River.

DRAINAGE AREA.--7,320 mi², approximately.

PERIOD OF RECORD.--October 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,146.96 ft above mean sea level.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Flow regulated by Winnibigoshish Lake (sta. 05201000), Leech Lake (sta. 05206000), Pokegama Lake (sta. 05210500), Sandy Lake (sta. 05218500), Pine River Reservoir at Cross Lake (sta. 05230500), and by hydro-plant in Brainerd.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1770	5550	6040	e4700	e4050	e3850	5290	11800	e5200	6860	5430	3210
2	1890	5750	6440	e4600	e4050	e3850	6390	11300	e4950	7210	5160	3060
3	1910	5950	6300	e4600	e4050	e3850	7560	10900	4710	8050	5250	2810
4	1750	5920	6400	e4500	e4050	e3850	9020	10600	4590	8200	4870	2910
5	1790	6110	6310	e4500	e4050	e3800	10600	10300	4410	8640	4710	2870
6	1880	6270	6230	e4200	e4050	e3800	13100	9600	4150	8830	4690	2840
7	1880	6450	6720	e4100	e4000	e3800	14400	9340	4160	8780	4280	2790
8	1830	6530	6560	e4000	e4000	e3800	14900	e9300	3850	8840	4220	2770
9	1820	6530	6290	e3900	e4000	e3800	15200	e9100	4010	8770	4090	2770
10	1770	6630	6520	e3800	e4000	e3800	15200	e8900	3770	8700	4080	2870
11	1630	6590	6210	e3700	e4000	e3800	15100	e8700	3630	8650	3780	2850
12	1740	6290	6110	e3700	e4000	e3800	14900	e8500	3610	8480	3820	2730
13	1620	5380	6220	e3700	e4000	e3800	14700	e8250	3330	8390	3670	2730
14	1730	4390	6570	e3700	e4000	e3800	14500	e8000	3320	8500	3510	2730
15	1600	4270	6340	e3700	e4000	e3800	14400	e7800	3330	8730	3500	2710
16	1760	4200	6580	e3800	e3950	e3800	14300	e7600	3210	8700	3420	2720
17	2270	5060	6570	e3900	e3950	e3800	14200	e7400	3030	8480	3160	2730
18	1870	5790	e6000	e4000	e3950	e3800	14200	e7150	3030	7930	3040	2980
19	2570	5320	e5800	e4100	e3950	e3800	14200	e6900	2840	7320	3170	2990
20	2700	5660	e5600	e4200	e3950	e3800	14000	e6700	2870	6960	3150	3010
21	3220	5810	e5700	e4160	e3950	e3800	13800	e6500	2850	6830	3070	3390
22	3650	6170	e5800	e4150	e3900	e3800	13700	e6400	2810	6550	3090	3350
23	3850	6000	e5700	e4150	e3900	e3800	13600	e6400	2960	6580	3310	3280
24	4110	5710	e5600	e4100	e3900	3820	13400	e6300	2950	6270	3390	3030
25	4240	6280	e5400	e4100	e3900	3860	13200	e6300	3200	6140	3390	3230
26	4410	6240	e5200	e4100	e3900	4000	13000	e6200	3860	6000	3540	3150
27	4390	6340	e5100	e4100	e3900	3880	12800	e6100	4120	6210	3480	3070
28	4580	6240	e5000	e4100	e3850	4030	12500	e5900	4550	6100	3370	3300
29	4830	6090	e4900	e4050	---	4200	12400	e5700	5060	5880	3350	3050
30	4920	6090	e4800	e4050	---	4450	12000	e5500	5870	5740	3360	3170
31	5120	---	e4700	e4050	---	4750	---	e5300	---	5500	3150	---
TOTAL	85100	175610	183710	126510	111250	120590	386560	244740	114230	232820	117500	89100
MEAN	2745	5854	5926	4081	3973	3890	12890	7895	3808	7510	3790	2970
MAX	5120	6630	6720	4700	4050	4750	15200	11800	5870	8840	5430	3390
MIN	1600	4200	4700	3700	3850	3800	5290	5300	2810	5500	3040	2710
AC-FT	168800	348300	364400	250900	220700	239200	766700	485400	226600	461800	233100	176700
CFSM	.38	.80	.81	.56	.54	.53	1.76	1.08	.52	1.03	.52	.41
IN.	.43	.89	.93	.64	.57	.61	1.96	1.24	.58	1.18	.60	.45

e Estimated

UPPER MISSISSIPPI RIVER BASIN

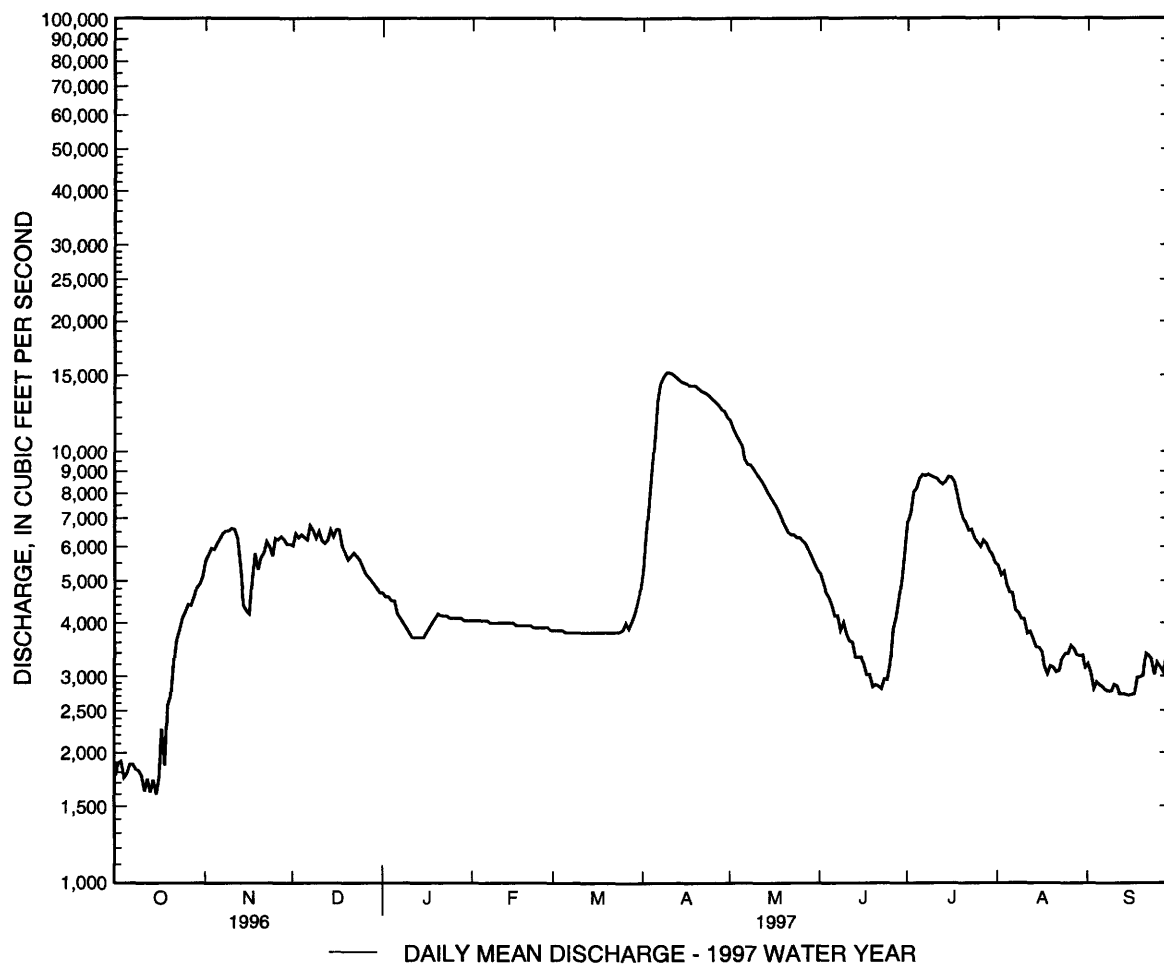
05242300 MISSISSIPPI RIVER AT BRAINERD, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	3213	3373	2909	2524	2337	2777	6015	5819	3650	4366	2462	2423
MAX	8002	5854	5926	4081	3973	3918	12890	10730	6193	10260	5071	3681
(WY)	1996	1997	1997	1997	1997	1995	1997	1996	1990	1993	1993	1993
MIN	1840	1931	1362	1140	1040	1435	3400	1928	662	442	935	1166
(WY)	1992	1993	1991	1991	1991	1991	1990	1988	1988	1988	1990	1990

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1987 - 1997
ANNUAL TOTAL	1807200	1987720	
ANNUAL MEAN	4938	5446	
HIGHEST ANNUAL MEAN			5446 1997
LOWEST ANNUAL MEAN			1950 1988
HIGHEST DAILY MEAN	13800	Apr 29 15200	Apr 9 15200 1997
LOWEST DAILY MEAN	1290	Sep 24 1600	Oct 15 348 1988
ANNUAL SEVEN-DAY MINIMUM	1330	Sep 21 1690	Oct 10 357 1988
INSTANTANEOUS PEAK FLOW		15400	Apr 10 15400 1997
INSTANTANEOUS PEAK STAGE		16.03	Apr 10 16.03 1997
INSTANTANEOUS LOW FLOW		1370	Oct 13 273a 1988
ANNUAL RUNOFF (AC-FT)	3585000	3943000	2450000
ANNUAL RUNOFF (CFSM)	.67	.74	.46
ANNUAL RUNOFF (INCHES)	9.18	10.10	6.28
10 PERCENT EXCEEDS	9610	8950	6560
50 PERCENT EXCEEDS	4080	4200	2990
90 PERCENT EXCEEDS	1760	2870	1340

a Result of regulation.



CROW WING RIVER BASIN

05243725 STRAIGHT RIVER NEAR PARK RAPIDS, MN

LOCATION.--Lat 46°52'30", long 95°03'56", in NW¹/₄NE¹/₄ sec. 11, T. 139 N., R. 35 W., Hubbard County, Hydrologic Unit 07010106 upstream from culvert on U.S. Highway 71 3.2 mi south of Park Rapids.

DRAINAGE AREA.--53.2 mi².

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1970-71, 1973, 1975-76. October 1986 to current year (no winter records in 1987, 1990-91). Records of hourly water temperature, available in files of the Geological Survey.

GAGE.--Water-stage recorder. Datum of gage is 1,399.55 ft above mean sea level (levels by Minnesota Department of Natural Resources).

REMARKS.--Records good except those for estimated daily discharges, which are fair.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	73	e88	e58	e60	e60	e62	79	92	71	105	62	74
2	72	e80	e58	e60	e60	e62	93	78	78	107	61	74
3	e61	e74	e59	e60	e61	e62	95	75	75	107	69	74
4	e50	e71	e59	e60	e61	e62	103	78	73	105	70	73
5	e52	e70	e59	e60	e61	e62	123	80	70	101	72	73
6	e55	e70	e60	e60	e61	e62	144	80	67	96	76	73
7	e55	e70	e60	e60	e61	e62	e125	80	64	93	74	72
8	e55	e69	e60	e60	e61	e61	e120	78	63	94	73	75
9	e57	e66	e60	e60	e61	e61	120	70	62	89	72	78
10	e58	e65	e60	e60	e61	e61	112	67	60	85	71	80
11	e55	e62	e61	e60	e61	e61	108	69	60	83	69	79
12	e56	e61	e61	e60	e61	e60	101	71	58	83	70	77
13	e55	e60	e61	e60	e61	e60	95	66	56	86	68	76
14	e58	e60	e61	e60	e61	e60	95	69	55	88	66	75
15	e58	e60	e62	e60	e61	e59	105	71	59	85	68	77
16	e58	e61	e62	e60	e61	e59	105	68	59	81	67	81
17	e81	e61	e62	e60	e61	e59	103	65	61	78	68	83
18	e96	e60	e62	e60	e61	e58	103	66	62	77	67	82
19	e81	e60	e62	e60	e61	e58	95	69	59	77	69	80
20	e78	e60	e62	e60	e61	e58	82	69	65	74	70	78
21	e74	e60	e62	e60	e62	e58	81	69	68	71	70	76
22	e71	e60	e62	e60	e62	e58	98	70	65	69	70	75
23	e68	e59	e62	e60	e62	e58	101	87	69	68	71	74
24	e64	e59	e62	e60	e62	e58	102	96	83	67	72	75
25	e62	e58	e62	e60	e62	e58	93	89	96	65	73	76
26	e65	e58	e62	e60	e62	e58	85	83	92	66	73	75
27	e77	e58	e62	e60	e62	e59	85	80	83	67	74	74
28	e70	e57	e61	e60	e62	e60	84	76	85	68	75	77
29	e81	e57	e61	e60	---	e62	91	73	86	67	75	78
30	e114	e57	e61	e60	---	e66	94	71	107	63	73	78
31	e96	---	e61	e60	---	e73	---	68	---	62	70	---
TOTAL	2106	1911	1887	1860	1714	1877	3020	2323	2111	2527	2178	2292
MEAN	67.9	63.7	60.9	60.0	61.2	60.5	101	74.9	70.4	81.5	70.3	76.4
MAX	114	88	62	60	62	73	144	96	107	107	76	83
MIN	50	57	58	60	60	58	79	65	55	62	61	72
AC-FT	4180	3790	3740	3690	3400	3720	5990	4610	4190	5010	4320	4550
CFSM	1.28	1.20	1.14	1.13	1.15	1.14	1.89	1.41	1.32	1.53	1.32	1.44
IN.	1.47	1.34	1.32	1.30	1.20	1.31	2.11	1.62	1.48	1.77	1.52	1.60

e Estimated

CROW WING RIVER BASIN

05243725 STRAIGHT RIVER NEAR PARK RAPIDS, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 1997, BY WATER YEAR (WY)

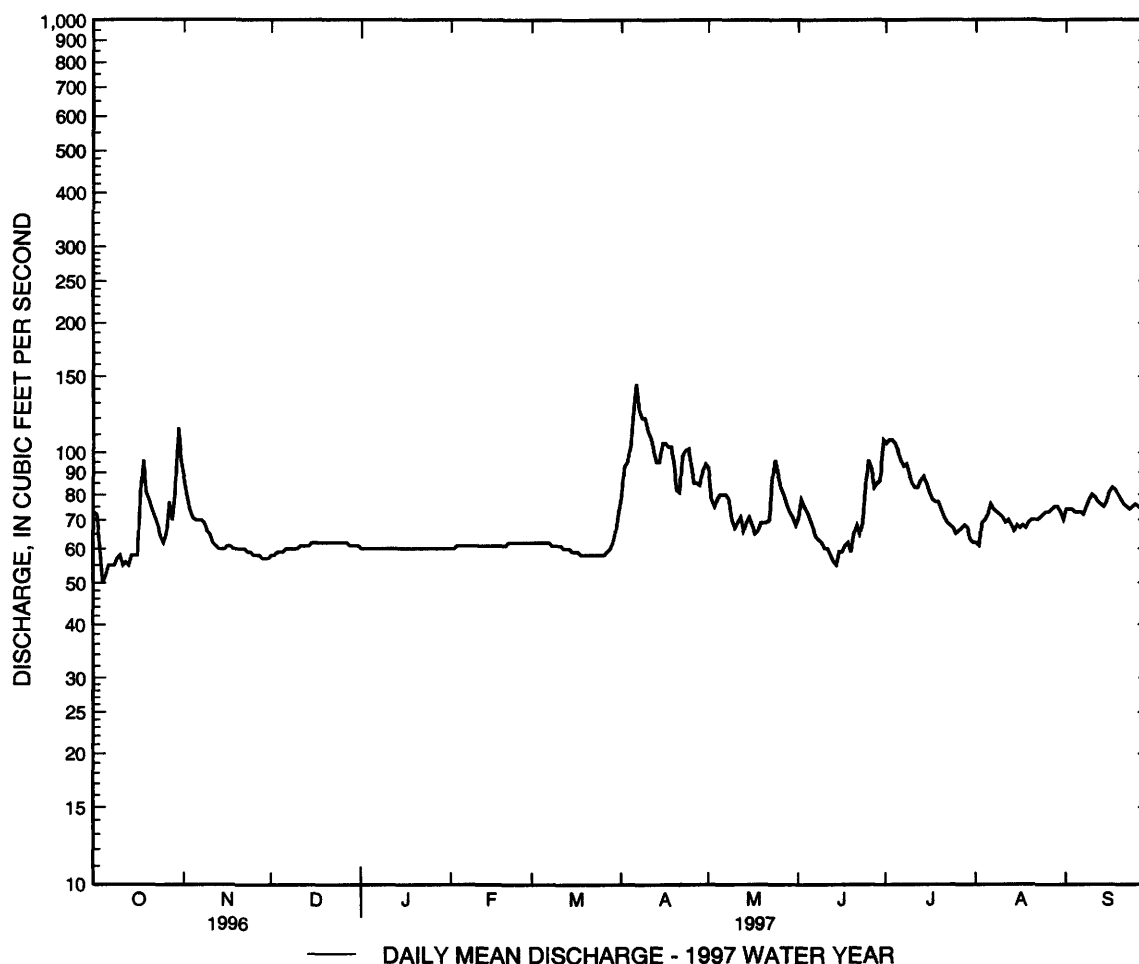
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	60.0	61.3	58.3	51.7	53.3	61.3	71.4	65.2	57.4	56.5	53.6	57.6
MAX	83.1	74.6	74.5	64.3	64.6	76.8	101	82.1	70.4	81.5	74.7	76.4
(WY)	1996	1996	1995	1995	1995	1995	1997	1996	1997	1997	1993	1997
MIN	42.2	47.4	46.0	41.9	44.8	50.9	56.1	46.2	41.9	39.5	35.9	38.7
(WY)	1993	1989	1989	1992	1992	1989	1991	1992	1992	1988	1990	1990

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1987 - 1997
ANNUAL TOTAL	24156	25806	
ANNUAL MEAN	66.0	70.7	60.2
HIGHEST ANNUAL MEAN			70.7
LOWEST ANNUAL MEAN			48.0
HIGHEST DAILY MEAN	114	Oct 30	144
LOWEST DAILY MEAN	50	Jan 5	50
ANNUAL SEVEN-DAY MINIMUM	51	Feb 1	55
INSTANTANEOUS PEAK FLOW		149	Apr 6
INSTANTANEOUS PEAK STAGE		2.33 _a	Apr 6
INSTANTANEOUS LOW FLOW			2.84 _b
ANNUAL RUNOFF (AC-FT)	47910	51190	43610
ANNUAL RUNOFF (CFSM)	1.24	1.33	1.13
ANNUAL RUNOFF (INCHES)	16.89	18.04	15.37
10 PERCENT EXCEEDS	84	93	76
50 PERCENT EXCEEDS	62	66	58
90 PERCENT EXCEEDS	55	59	44

a Maximum observed.

b From floodmark, backwater from ice.

c Result of freezeup.



CROW WING RIVER BASIN

05244000 CROW WING RIVER AT NIMROD, MN

LOCATION.--Lat 46°38'25", long 94°52'44", in SE¹/₄NW¹/₄ sec. 32, T. 137 N., R. 33 W., Wadena County, Hydrologic Unit 07010106, on right bank 200 ft upstream from highway bridge, 0.2 mi north of Nimrod, and 0.7 mi upstream from Cat River.

DRAINAGE AREA.--1,010 mi² (2,620 km²), approximately.

PERIOD OF RECORD.--April 1910 to September 1914, July 1930 to September 1981, October 1991 to current year (winter records incomplete prior to 1940). October 1981 to September 1987, annual maximums only.

REVISED RECORDS.--WSP 1508: 1910-11, 1913-14, 1937, 1942(M), 1944(M).

GAGE.--Water-stage recorder. Datum of gage is 1,313.27 ft above sea level (levels by Wadena County Highway Department from Minnesota Department of Transportation bench mark). Apr. 15, 1910 to Sept. 30, 1914, nonrecording gage at same site, at datum 2.2 ft lower. July 28, 1930 to Nov. 4, 1949, nonrecording gages at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Flow affected by natural storage in many lakes.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	421	702	e660	e380	e375	e370	e600	1100	711	817	753	487
2	417	705	e650	e380	e370	e370	e900	1070	664	940	715	494
3	417	704	e640	e380	e370	e380	e1100	1040	643	1050	716	485
4	429	661	e630	e380	e370	e380	1510	996	628	1200	701	490
5	434	667	e620	e380	e370	e380	1730	961	621	1200	672	475
6	434	680	e600	e380	e370	e380	2020	933	605	1180	678	454
7	423	691	e585	e375	e370	e380	1770	908	595	1220	660	444
8	407	683	e565	e375	e365	e380	e1650	921	581	1320	644	462
9	395	660	e555	e375	e365	e380	e1560	901	565	1340	629	463
10	382	e630	e540	e375	e365	e380	e1600	864	548	1320	622	461
11	371	e620	e530	e375	e365	e380	e1700	840	531	1290	605	455
12	357	e570	e520	e380	e365	e380	e1800	812	518	1280	589	462
13	344	e560	e510	e380	e360	e385	1840	777	490	1330	573	473
14	339	e565	e500	e380	e360	e385	1750	769	464	1440	558	466
15	349	e590	e490	e380	e355	e380	1670	752	475	1420	546	465
16	352	e620	e460	e380	e350	e380	1590	726	473	1360	535	473
17	425	e680	e435	e380	e350	e380	1510	709	463	1300	533	479
18	490	e650	e415	e380	e350	e380	1440	695	469	1230	518	480
19	508	e720	e390	e375	e345	e380	1400	679	468	1190	518	486
20	514	e780	e370	e375	e345	e390	1370	644	514	1140	526	491
21	529	e770	e370	e375	e350	e390	1350	625	471	1090	516	501
22	526	e750	e370	e375	e355	e395	1310	630	447	1050	503	491
23	509	e730	e375	e375	e360	e400	1270	707	503	1010	506	471
24	497	e720	e380	e375	e365	e410	1230	811	578	989	501	447
25	486	e700	e380	e375	e370	e420	1200	818	652	973	506	432
26	494	e690	e380	e375	e370	e430	1190	810	626	946	509	419
27	538	e690	e380	e375	e370	e440	1190	802	614	913	495	412
28	500	e680	e380	e375	e370	e450	1170	802	701	876	489	425
29	529	e680	e380	e375	---	e460	1140	800	824	843	480	439
30	702	e670	e380	e375	---	e480	1120	787	804	812	470	448
31	687	---	e380	e375	---	e500	---	759	---	783	457	---
TOTAL	14205	20218	14820	11690	10145	12375	42680	25448	17246	34852	17723	13930
MEAN	458	674	478	377	362	399	1423	821	575	1124	572	464
MAX	702	780	660	380	375	500	2020	1100	824	1440	753	501
MIN	339	560	370	375	345	370	600	625	447	783	457	412
AC-FT	28180	40100	29400	23190	20120	24550	84660	50480	34210	69130	35150	27630
CFSM	.45	.67	.47	.37	.36	.40	1.41	.81	.57	1.11	.57	.46

e Estimated

CROW WING RIVER BASIN

05244000 CROW WING RIVER AT NIMROD, MN--Continued

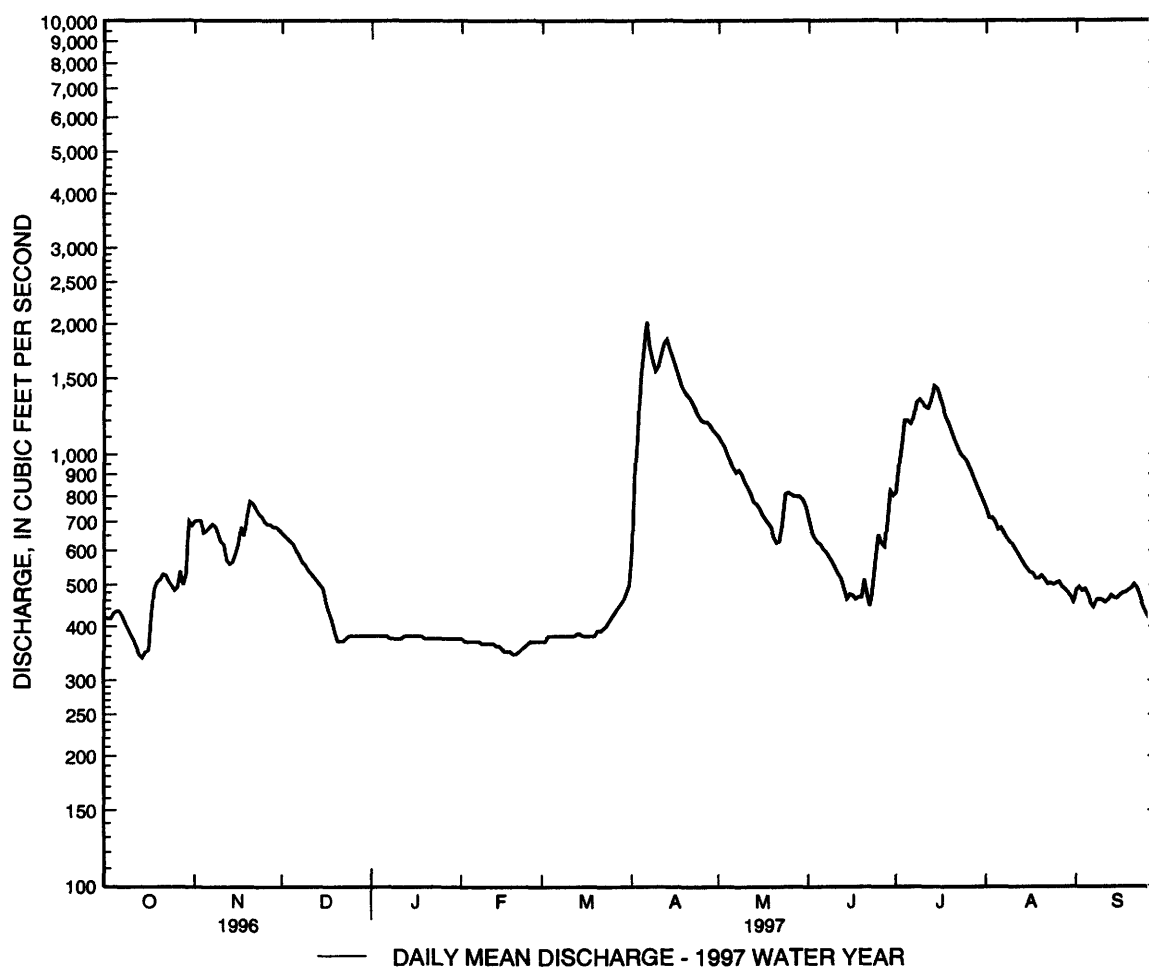
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1910 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	409	402	337	298	300	403	760	670	571	443	375	383
MAX	1463	871	596	462	456	780	1624	1615	1354	1124	1452	929
(WY)	1974	1972	1952	1966	1966	1995	1966	1950	1965	1997	1944	1944
MIN	137	146	131	125	170	171	202	181	149	84.0	74.3	131
(WY)	1937	1937	1940	1940	1940	1940	1911	1911	1934	1936	1936	1934

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1910 - 1997
ANNUAL TOTAL	199944	235332	
ANNUAL MEAN	546	645	477
HIGHEST ANNUAL MEAN			719
LOWEST ANNUAL MEAN			230
HIGHEST DAILY MEAN	1510	Apr 25	2020
LOWEST DAILY MEAN	250	Sep 1	339
ANNUAL SEVEN-DAY MINIMUM	258	Jul 20	349
INSTANTANEOUS PEAK FLOW			2050
INSTANTANEOUS PEAK STAGE			6.60 _a
INSTANTANEOUS LOW FLOW			333
10 PERCENT EXCEEDS	898		1190
50 PERCENT EXCEEDS	460		510
90 PERCENT EXCEEDS	313		370

a Ice jam.

b Backwater from ice.



CROW WING RIVER BASIN

05245100 LONG PRAIRIE RIVER AT LONG PRAIRIE, MN

LOCATION.--Lat 45°58'30", long 94°51'56", in NE¹/₄NW¹/₄ sec. 20, T. 129 N., R. 33 W., Todd County, Hydrologic Unit 07010108, on right bank 90 ft upstream from bridge on First Avenue at Long Prairie and 400 ft downstream from Venewitz Creek.

DRAINAGE AREA.--432 mi².

PERIOD OF RECORD.--October 1971 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,281.74 ft above mean sea level.

REMARKS.--Records good except those for estimated daily discharges, which are fair to poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	120	160	e132	e99	e120	e149	e300	498	229	181	188	163
2	111	163	e132	e103	e125	e147	e500	477	223	195	183	158
3	106	185	e131	e110	e130	e144	e940	457	218	199	183	153
4	101	276	e130	e117	e136	e141	e1060	431	215	205	182	151
5	95	360	e130	e120	e139	e140	e1150	405	211	205	176	149
6	90	228	e129	e120	e139	e137	e1200	376	209	200	177	145
7	85	204	e129	e118	e138	e133	1330	357	206	196	172	142
8	85	200	e128	e114	e137	e133	1490	355	205	196	168	142
9	84	194	e129	e111	e136	e138	1360	346	204	194	166	138
10	80	192	e129	e108	e134	e141	1220	343	201	192	164	134
11	79	168	e128	e108	e132	e140	1090	350	198	190	161	131
12	78	142	e128	e107	e131	e136	1000	346	195	191	159	130
13	77	e142	e127	e106	e130	e131	905	331	192	250	157	131
14	75	e149	e125	e102	e128	e127	844	324	187	222	160	130
15	74	e150	e125	e100	e130	e126	805	312	190	219	163	133
16	76	e148	e125	e98	e133	e127	767	302	189	226	159	134
17	134	e152	e123	e97	e136	e129	741	294	187	233	156	132
18	152	e157	e120	e96	e142	e132	722	287	184	236	154	132
19	171	e159	e118	e95	e145	e135	704	282	186	237	179	134
20	178	e158	e114	e96	e149	e135	685	275	194	227	191	129
21	170	e153	e107	e98	e147	e136	668	267	193	216	183	125
22	154	e152	e101	e100	e143	e137	652	261	187	206	179	122
23	146	e151	e101	e100	e141	e139	641	262	186	203	180	118
24	138	e151	e105	e101	e143	e144	629	266	184	200	182	110
25	134	e150	e105	e101	e148	e150	615	265	182	216	184	102
26	133	e145	e100	e101	e150	e158	600	263	180	206	184	93
27	132	e138	e98	e103	e150	e165	580	258	176	200	179	94
28	131	e131	e95	e107	e149	e173	555	251	176	197	175	106
29	144	e129	e96	e111	---	e187	533	249	181	196	177	107
30	184	e133	e95	e114	---	e208	516	242	181	194	171	109
31	187	---	e96	e117	---	e233	---	235	---	191	164	---
TOTAL	3704	5120	3631	3278	3861	4551	24802	9967	5849	6419	5356	3877
MEAN	119	171	117	106	138	147	827	322	195	207	173	129
MAX	187	360	132	120	150	233	1490	498	229	250	191	163
MIN	74	129	95	95	120	126	300	235	176	181	154	93
AC-FT	7350	10160	7200	6500	7660	9030	49190	19770	11600	12730	10620	7690
CFSM	.28	.40	.27	.24	.32	.34	1.91	.74	.45	.48	.40	.30

e Estimated

CROW WING RIVER BASIN

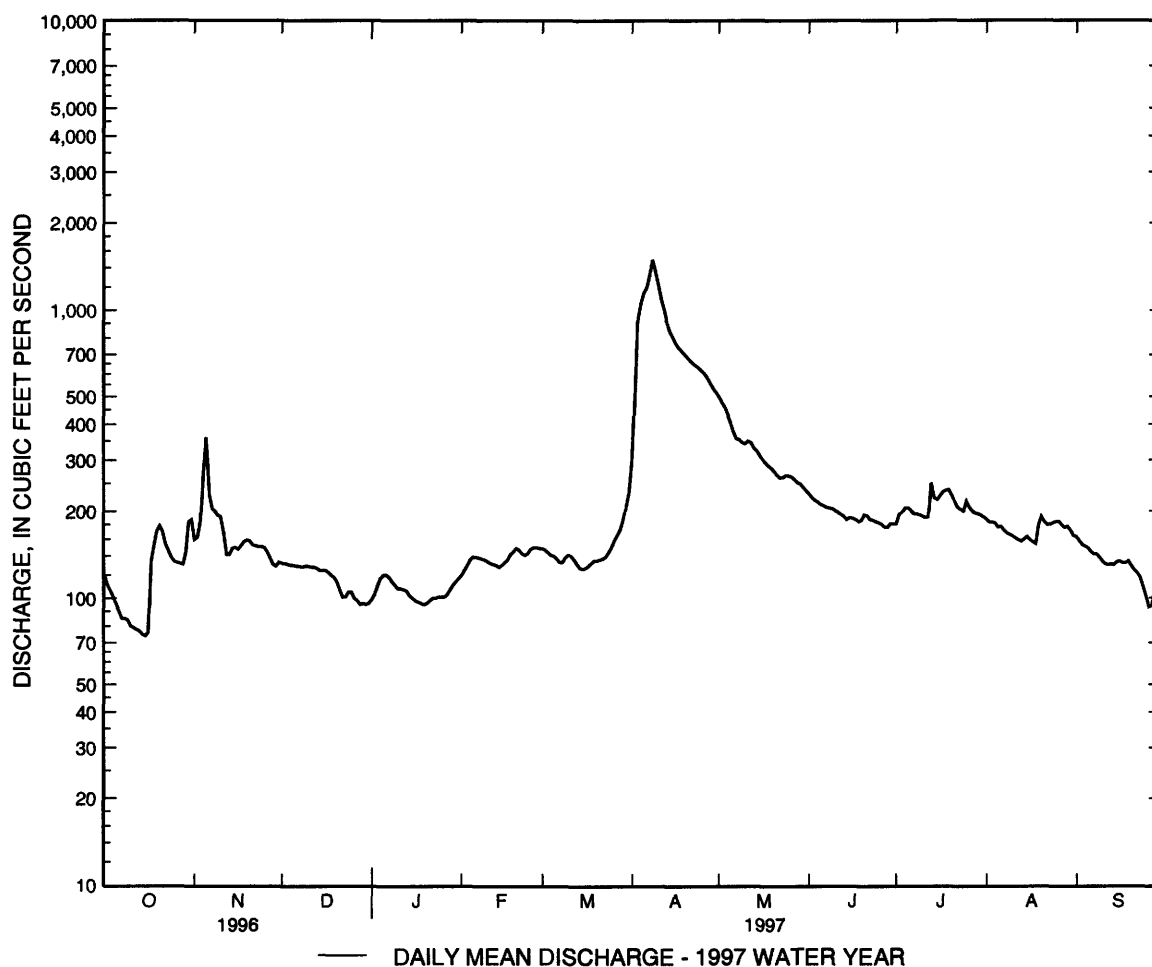
05245100 LONG PRAIRIE RIVER AT LONG PRAIRIE, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1972 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	133	119	76.0	62.4	63.1	176	371	263	210	186	139	121
MAX	512	425	270	217	208	441	827	653	422	777	715	607
(WY)	1987	1972	1987	1987	1987	1985	1997	1986	1985	1972	1972	1986
MIN	13.4	8.69	3.19	1.05	1.62	19.8	71.8	45.5	27.5	4.73	10.0	5.32
(WY)	1977	1977	1977	1977	1977	1989	1977	1977	1988	1988	1989	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1972 - 1997
ANNUAL TOTAL	73370	80415	
ANNUAL MEAN	200	220	160
HIGHEST ANNUAL MEAN			366
LOWEST ANNUAL MEAN			25.2
HIGHEST DAILY MEAN	1040	Apr 11	1490
LOWEST DAILY MEAN	66	Sep 20	74
ANNUAL SEVEN-DAY MINIMUM	72	Sep 15	77
INSTANTANEOUS PEAK FLOW		1580	Apr 8
INSTANTANEOUS PEAK STAGE		8.29	Apr 6a
INSTANTANEOUS LOW FLOW		74	Oct 14
ANNUAL RUNOFF (AC-FT)	145500	159500	116000
ANNUAL RUNOFF (CFSM)	.46	.51	.37
10 PERCENT EXCEEDS	406	358	369
50 PERCENT EXCEEDS	131	153	101
90 PERCENT EXCEEDS	91	102	24

a Backwater from ice.



CROW WING RIVER BASIN

05246500 GULL LAKE NEAR BRAINERD, MN

LOCATION.--Lat 46°24'40", long 94°21'26", in NE¹/₄ sec. 20, T. 134 N., R. 29 W., Cass County, Hydrologic Unit 07010106, in pool of dam on Gull River, 800 ft south of outlet of Gull Lake, 0.2 mi upstream from Gull Lake Dam, and 8 mi northwest of Brainerd.

DRAINAGE AREA.--287 mi².

PERIOD OF RECORD.--August 1911 to current year. Prior to October 1941 monthend contents only, published in WSP 1308. Published as Gull Lake Reservoir October 1941 to September 1956.

GAGE.--Water-stage recorder. Datum of gage is in mean sea level (levels by U.S. Army Corps of Engineers). Prior to Aug. 10, 1949, nonrecording gage 800 ft north of present site at same datum. Aug. 11, 1949 to June 30, 1973, water-stage recorder at present site and at datum 1,188.14 ft, adjustment of 1912.

REMARKS.--Reservoir is formed by Gull Lake and several other natural lakes controlled by concrete dam completed in 1913; storage began in 1912. Capacity between elevation 1,192.75 ft and 1,194.75 ft (maximum allowable range and normal operating range) is 26,008 acre-ft. Contents shown herein are contents above elevation 1,188.00 ft. Prior to September 1978, published contents as contents above elevation 1,188.75 ft. Water is used to benefit navigation on Mississippi River below Minneapolis.

COOPERATION.--Records were provided by U.S. Army Corps of Engineers.

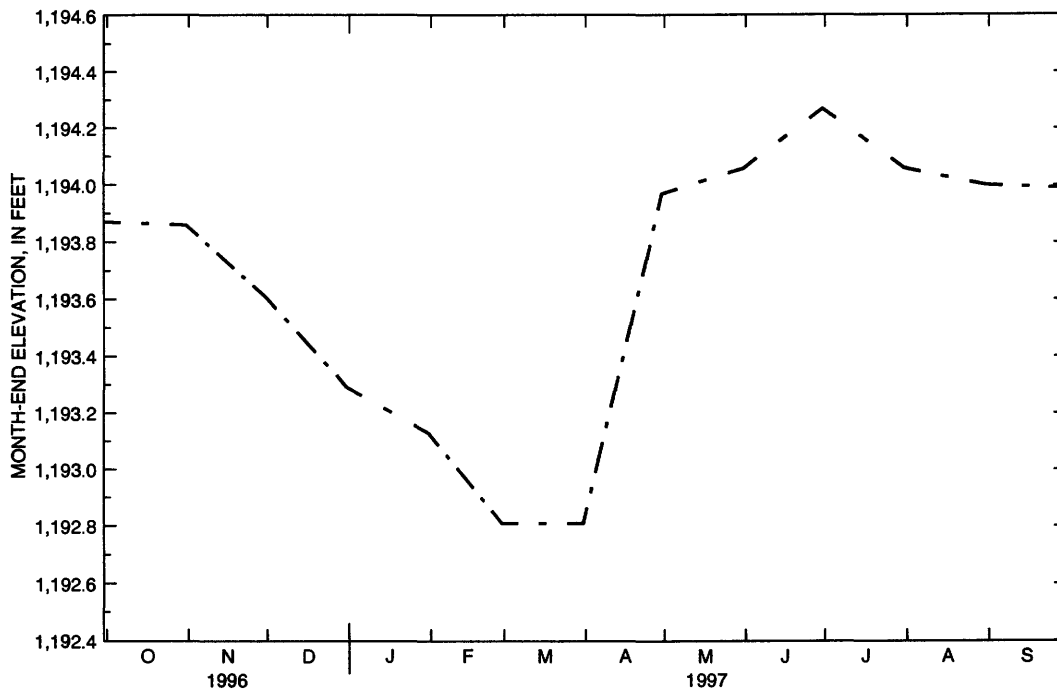
EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 74,800 acre-ft, capacity table then in use, June 30, 1914, elevation, 1,195.05 ft; minimum observed, 22,250 acre-ft, capacity table then in use, Mar. 20, 1924, elevation, 1,190.75 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 64,810 acre-ft, July 2, elevation, 1194.29 ft; minimum, 43,900 acre-ft, Mar. 20 elevation, 1,192.67.

MONTH-END ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30	1193.87	59330	
Oct. 31	1193.86	59200	-130
Nov. 30	1193.61	55940	-3260
Dec. 31	1193.29	51810	-4130
CAL YR 1996			-2710
Jan. 31	1193.13	49730	-2080
Feb. 28	1192.81	45590	-4140
Mar. 31	1192.81	45590	0
Apr. 30	1193.97	60630	+15040
May 31	1194.06	61810	+1180
June 30	1194.27	64550	+2740
July 31	1194.06	61810	-2740
Aug. 31	1194.00	61020	-790
Sept. 30	1193.99	60890	-130
WTR YR 1997			+1560

CROW WING RIVER BASIN
05246500 GULL LAKE NEAR BRAINERD, MN--Continued



CROW WING RIVER BASIN

05247500 CROW WING RIVER NEAR PILLAGER, MN

LOCATION.--Lat 46°18'18", long 94°22'38", in SW¹/₄NE¹/₄ sec. 30, T. 133 N., R. 29 W., Cass County, Hydrologic Unit 07010106, at Sylvan dam power plant of Minnesota Power Co., 3.6 mi above mouth and 4.9 mi southeast of Pillager.

DRAINAGE AREA.--3,520 mi², approximately.

PERIOD OF RECORD.--October 1968 to September 1986, October 1987 to current year. Records for August 1924 to September 1968 available in files of the Minnesota District Office.

GAGE.--Water stage recorder. Datum of gage is 1,151.00 ft, adjustment of 1912. Prior to January 16, 1991, staff gage attached to retaining wall approximately 20 ft below the turbine outlet bays. Datum of staff gage is 1,150.00 ft, adjustment of 1912.

REMARKS.--Records good except those for estimated daily discharges, which are fair to poor. Discharge computed on the basis of power plant records prior to January 16, 1991. Records for Oct. 1, 1968 to Sept. 30, 1975, were adjusted for storage change in the Sylvan dam reservoir. Flow partly regulated by power plants and Gull Lake (station 05246500).

COOPERATION.--Records collected by Minnesota Power Company prior to February 1991, in connection with a Federal Power Commission project.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum daily discharge since 1924, 18,300 ft³/s, Apr. 14, 1965.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	972	2140	1640	e900	e1130	1290	2890	3850	1820	2700	1770	1310
2	943	2010	1590	e870	e1160	1200	4500	3730	1970	2670	1760	1200
3	780	2170	1470	e860	e1220	1160	5930	3570	1740	2830	1730	1140
4	856	2720	1550	e850	e1200	1230	8450	3550	1700	2980	1800	1130
5	879	2510	1590	e840	e1120	1200	12100	3960	1590	3020	1810	1130
6	873	2300	1550	e830	e1160	1190	14300	2400	1350	2930	1730	1120
7	840	2290	1510	e830	e1200	1180	16100	1430	1210	2920	1700	1080
8	888	2390	1460	e840	e1150	1260	15800	2480	1240	2910	1600	1140
9	869	2370	1460	e880	e1130	1180	15200	2650	1180	2700	1620	1130
10	796	2120	1460	e900	e1100	1160	14000	2290	1130	2500	1570	1120
11	786	1630	1450	e970	e1150	1160	12100	2390	942	2510	1500	1030
12	782	1290	1360	e1040	e1170	1220	10400	2440	901	2640	1420	1020
13	783	1100	1380	e1040	e1150	1230	9560	2340	895	2600	1340	1010
14	775	1270	1350	e1130	e1150	1180	8330	2310	806	2640	1330	1020
15	795	1300	1300	e1080	e1140	1140	7670	2330	917	2770	1420	1050
16	784	1320	e1250	e1120	e1140	1190	6910	2180	834	2790	1310	1040
17	1100	1620	e1230	e1150	e1130	1220	6830	2130	897	2610	1260	1040
18	1310	1660	e1200	e1120	e1150	1120	6720	2090	893	2550	1570	1020
19	1510	1710	e1150	e1090	e1150	1150	6430	2050	872	2560	1440	1020
20	1800	1780	e1100	e1100	e1140	1220	6260	1970	993	2570	1320	1020
21	1640	1660	e1000	e1110	e1130	1200	5870	1770	982	2510	1410	1020
22	1630	1660	e980	e1120	1130	1130	5600	1810	858	2300	1500	1020
23	1550	1650	e940	e1130	1210	1120	5280	2180	1130	2230	1500	1010
24	1540	1660	e920	e1120	1200	1280	5110	2570	1390	2320	1490	1010
25	1500	1600	e900	e1100	1290	1250	4860	2410	1660	2370	1190	926
26	1490	1400	e860	e1060	1290	1200	4760	2230	1600	2220	1530	911
27	1450	1400	e840	e1110	1140	1330	4620	2390	1670	2140	1580	928
28	1420	1430	e800	e1130	1250	1440	4510	2480	2170	2200	1300	833
29	1470	1500	e820	e1180	---	2100	4260	2240	2440	2050	1250	943
30	1830	1650	e830	e1180	---	2910	4050	1950	2660	1730	1200	1020
31	2250	---	e860	e1140	---	1680	---	1940	---	1740	1230	---
TOTAL	36891	53310	37800	31820	32680	40520	239400	76110	40440	78210	46180	31391
MEAN	1190	1777	1219	1026	1167	1307	7980	2455	1348	2523	1490	1046
MAX	2250	2720	1640	1180	1290	2910	16100	3960	2660	3020	1810	1310
MIN	775	1100	800	830	1100	1120	2890	1430	806	1730	1190	833
AC-FT	73170	105700	74980	63110	64820	80370	474800	151000	80210	155100	91600	62260
CFSM	.36	.54	.37	.31	.35	.40	2.42	.74	.41	.76	.45	.32
IN.	.42	.60	.43	.36	.37	.46	2.70	.86	.46	.88	.52	.35

e Estimated

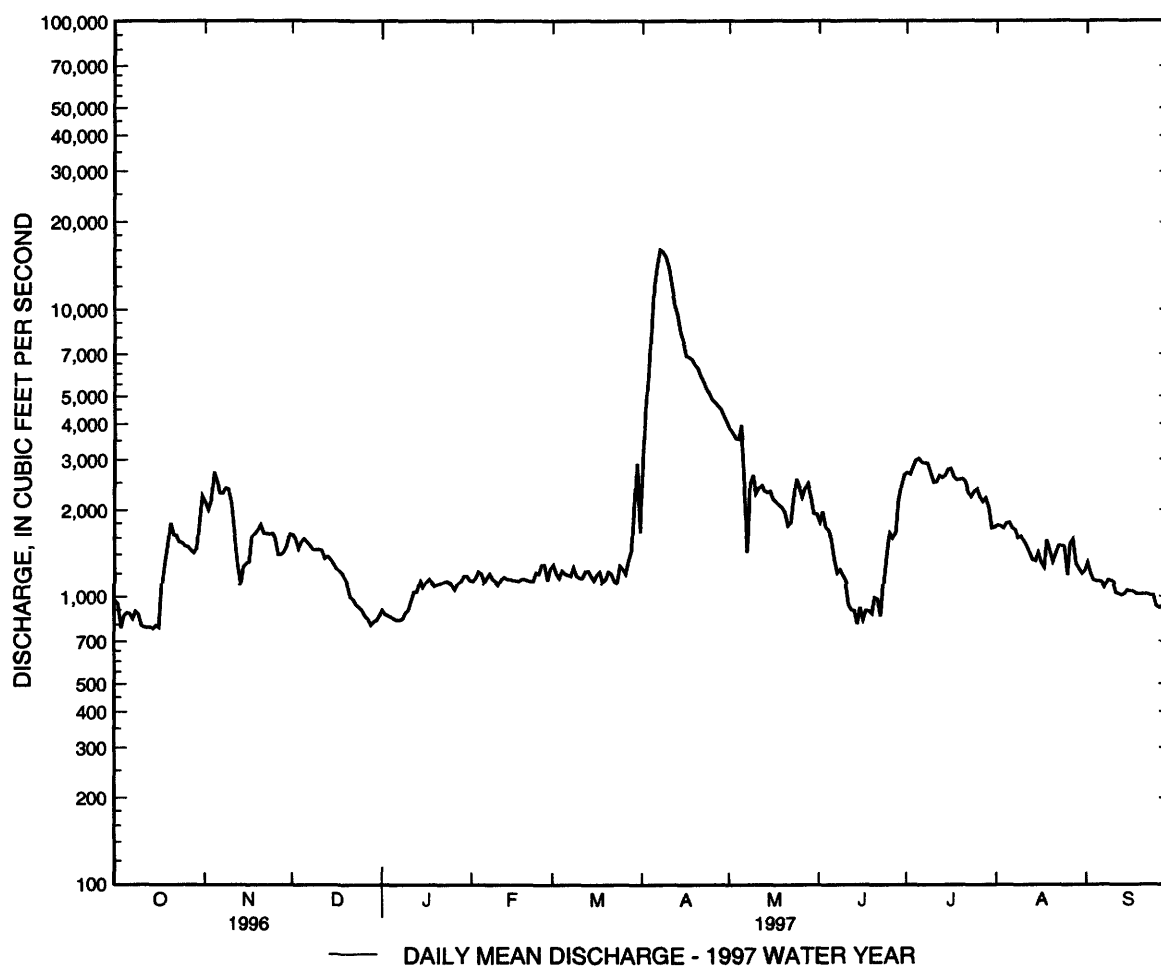
CROW WING RIVER BASIN

05247500 CROW WING RIVER NEAR PILLAGER, MN

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1969 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1217	1189	821	679	686	1347	3386	2344	1607	1374	979	915
MAX	3771	3674	1544	1188	1167	2996	7980	5671	3625	3295	3520	3309
(WY)	1974	1972	1972	1986	1997	1972	1997	1986	1993	1972	1972	1986
MIN	215	215	199	218	255	548	882	545	447	206	120	161
(WY)	1977	1977	1977	1977	1977	1981	1981	1977	1988	1988	1976	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1969 - 1997	
ANNUAL TOTAL	680322		744752		1380	
ANNUAL MEAN	1859		2040		2564	
HIGHEST ANNUAL MEAN					1972	
LOWEST ANNUAL MEAN					446	
HIGHEST DAILY MEAN	13900		Apr 15		16600	
LOWEST DAILY MEAN	616		Sep 1		60	
ANNUAL SEVEN-DAY MINIMUM	642		Aug 26		68	
ANNUAL RUNOFF (AC-FT)	1349000		1477000		999400	
ANNUAL RUNOFF (CFSM)	.56		.62		.42	
ANNUAL RUNOFF (INCHES)	7.67		8.40		5.68	
10 PERCENT EXCEEDS	3240		2950		2860	
50 PERCENT EXCEEDS	1220		1340		926	
90 PERCENT EXCEEDS	783		899		425	



UPPER MISSISSIPPI RIVER BASIN

05261000 MISSISSIPPI RIVER NEAR FORT RIPLEY, MN

LOCATION.--Lat 46°10'50", long 94°21'56", in SE¹/₄NW¹/₄ sec. 27, T. 43 N., R. 32 W., Crow Wing County, Hydrologic Unit 07010104, on left bank 600 ft upstream from Nokasippi River, 1.0 mile north of Fort Ripley, and a mile 982.1 upstream from Ohio River.

DRAINAGE AREA.--11,010 mi², approximately.

PERIOD OF RECORD.--June 1987 to current year. Operated as high-flow partial-record station October 1971 to June 1987. Prior to Oct. 1971 stage records collected by U.S. Weather Service.

GAGE.--Water-stage recorder. Datum of gage is 1,133.84 above sea level. Aug. 1904 to June 1987 nonrecording gages at different datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Flow partly regulated by power plants and Winnibigoshish, Leech, Pokegama, Sandy, and Gull Lakes and by Pine River Reservoir (see stations 05201000, 05206000, 05210500, 05218500, 05230500, 05246500).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2650	7510	e7700	e5600	e5200	e5150	7180	15200	6940	9170	6920	4250
2	2860	7340	e8050	e5470	e5250	e5050	9490	14600	6660	9850	6730	4350
3	2740	7690	e7800	e5460	e5300	e5050	12300	14000	6550	10400	6740	4020
4	2700	8170	e8000	e5350	e5250	e5100	16600	13400	6260	10900	6440	3970
5	2630	8200	e7900	e5340	e5200	e5000	21600	13100	6110	11600	6280	3970
6	2730	8230	e7800	e5030	e5250	e5000	26300	13300	5750	12000	6250	3940
7	2740	8130	e8250	e4930	e5200	e5000	29900	12100	5650	11900	5880	3900
8	2730	8450	e8050	e4840	e5150	e5100	31400	10300	5170	11900	5750	3860
9	2770	8400	e7750	e4780	e5150	e5000	31000	11000	5250	11700	5480	3860
10	2620	8390	e8000	e4700	e5100	e5000	30900	11000	5130	11400	5470	3900
11	2520	7900	e7700	e4670	e5150	e5000	30200	10600	4880	11100	5270	4050
12	2520	7510	e7500	e4740	e5200	e5050	28400	10400	4710	11000	5080	3790
13	2390	6810	e7600	e4740	e5150	e5050	26300	10200	4430	10900	4950	3760
14	2510	6140	e7950	e4830	e5150	e5000	24900	9880	4290	10900	4710	3770
15	2510	5570	e7650	e4780	e5150	e4950	23800	9630	4240	11300	4660	3790
16	2430	5310	e7830	e4920	e5100	e5000	22800	9380	4230	11400	4610	3840
17	3100	6170	e7800	e5050	e5100	e5050	22000	9100	4070	11300	4500	3800
18	3240	7580	e7200	e5120	e5100	e4950	21500	8880	4020	10700	4200	3930
19	3800	e7050	e6950	e5190	e5100	e4950	21200	8580	3990	9980	4390	3970
20	4300	e7450	e6700	e5300	e5100	e5050	20600	8440	3860	9560	4510	3950
21	4650	e7500	e6700	e5300	e5100	e5000	20200	8200	3970	9360	4240	4160
22	4880	e7850	e6780	e5300	e5050	e4950	19600	7880	4030	9100	4240	4370
23	5230	e7650	e6640	e5300	e5150	e4950	19000	7680	3900	8780	4480	4250
24	5400	e7400	e6520	e5250	e5100	e5100	18500	7990	4170	8470	4710	4100
25	5520	e7900	e6300	e5200	e5200	e5150	17900	8380	4580	8300	4570	4130
26	5660	e7650	e6060	e5200	e5200	e5200	17500	8340	5330	8290	4610	4100
27	5740	e7750	e5940	e5250	e5050	e5250	17000	7950	5870	8160	4700	3950
28	5750	e7700	e5800	e5250	e5100	e5500	16600	8030	6120	7990	4850	4190
29	6110	e7600	e5720	e5250	---	e6300	16200	8010	7060	7780	4540	3930
30	6600	e7750	e5630	e5250	---	e7400	15600	7750	8010	7620	4470	3880
31	7010	---	e5560	e5200	---	e6450	---	7300	---	7030	4330	---
TOTAL	119040	224750	221830	158590	144300	161750	636470	310600	155230	309840	158560	119730
MEAN	3840	7492	7156	5116	5154	5218	21220	10020	5174	9995	5115	3991
MAX	7010	8450	8250	5600	5300	7400	31400	15200	8010	12000	6920	4370
MIN	2390	5310	5560	4670	5050	4950	7180	7300	3860	7030	4200	3760
AC-FT	236100	445800	440000	314600	286200	320800	1262000	616100	307900	614600	314500	237500
CFSM	.35	.68	.65	.46	.47	.47	1.93	.91	.47	.91	.46	.36

e Estimated

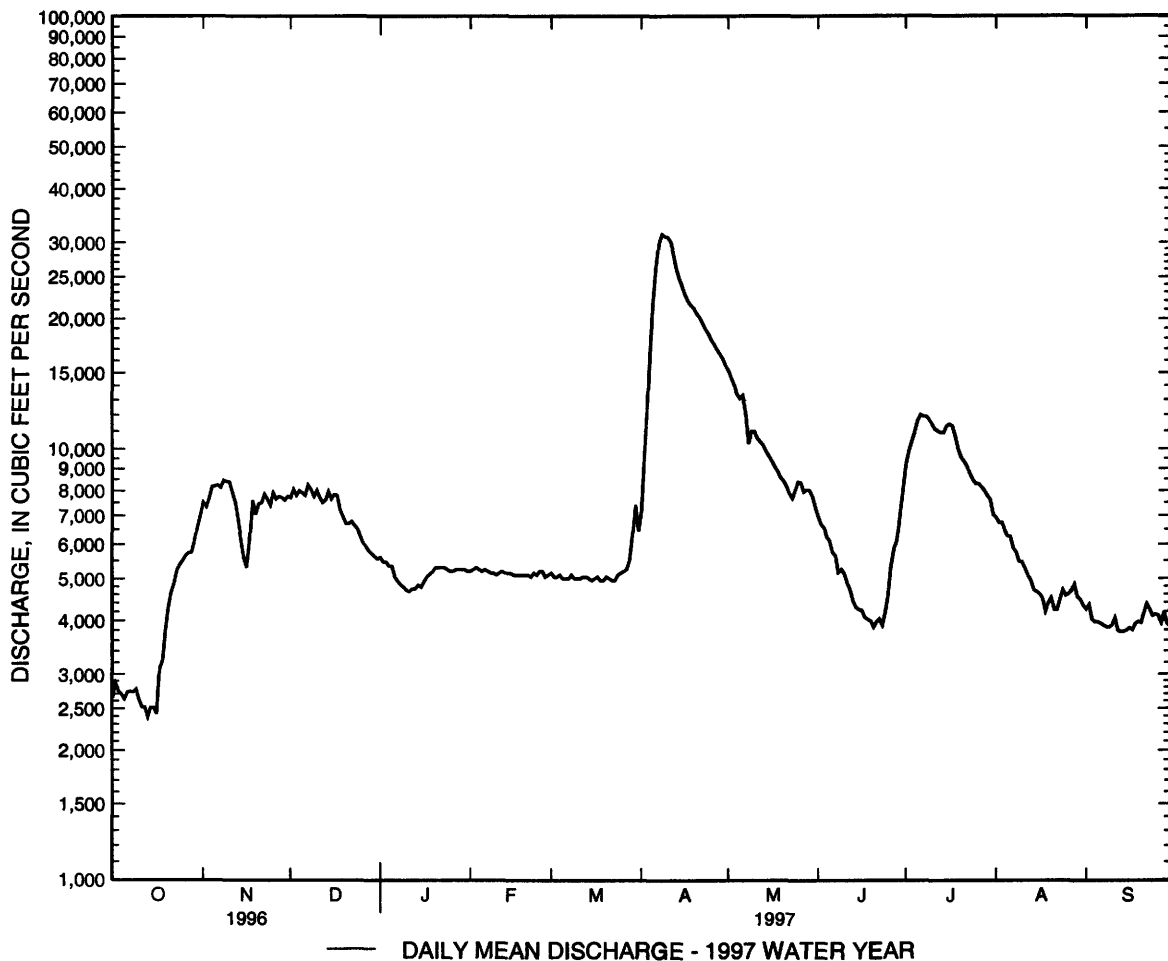
UPPER MISSISSIPPI RIVER BASIN

05261000 MISSISSIPPI RIVER NEAR FORT RIPLEY, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	4421	4454	3660	3177	2994	4514	9986	8578	5283	5832	3591	3443
MAX	11380	7590	7156	5116	5154	7156	21220	14240	9972	13710	7293	5657
(WY)	1996	1996	1997	1997	1997	1995	1997	1996	1993	1993	1993	1993
MIN	2563	2624	1827	1518	1508	2559	5510	3025	1196	729	1517	1769
(WY)	1993	1993	1991	1991	1991	1993	1990	1988	1988	1988	1989	1990

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1987 - 1997
ANNUAL TOTAL	2485980	2720690	
ANNUAL MEAN	6792	7454	5036
HIGHEST ANNUAL MEAN			7454
LOWEST ANNUAL MEAN			2813
HIGHEST DAILY MEAN	21100	Apr 22	31400
LOWEST DAILY MEAN	1990	Sep 25	2390
ANNUAL SEVEN-DAY MINIMUM	2190	Sep 19	2500
INSTANTANEOUS PEAK FLOW			32200
INSTANTANEOUS PEAK STAGE			14.15
INSTANTANEOUS LOW FLOW			2290
ANNUAL RUNOFF (AC-FT)	4931000	5396000	3648000
ANNUAL RUNOFF (CFSM)	.62	.68	.46
10 PERCENT EXCEEDS	13700	11900	9330
50 PERCENT EXCEEDS	5720	5500	4020
90 PERCENT EXCEEDS	2730	3950	1880



UPPER MISSISSIPPI RIVER BASIN

05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN

LOCATION.--Lat 45°51'41", long 94°21'33", in lot 2, sec. 20, T. 39 N., R. 32 W., Morrison County, Hydrologic Unit 07010104, at plant of Minnesota Power Co., 4 mi northwest of Royalton, 4.5 mi downstream from Swan River, and at mile 956 upstream from Ohio River.

DRAINAGE AREA.--11,600 mi², approximately.

PERIOD OF RECORD.--March 1924 to current year.

REMARKS.--Records fair. Discharge determined based on nearby gaging stations, furnished record from Minnesota Power Co., and observed flow. Flow partly regulated by power plants and Winnibigoshish, Leech, Pokegama, Sandy, and Gull Lakes and by Pine River Reservoir (see stations 05201000, 05206000, 05210500, 05218500, 05230500, 05246500).

COOPERATION.--Records collected by Minnesota Power Co. under general supervision of Geological Survey, in connection with a Federal Power Commission project.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2830	7850	8200	6100	5350	5500	10500	16700	7450	9950	8800	4960
2	2930	7900	7900	5900	5450	5400	15000	16300	7250	11000	8800	4830
3	2940	8150	7600	6100	5500	5400	18900	15600	6900	11100	9100	4630
4	2830	8700	8400	6000	5550	5300	24200	14800	6650	11700	8400	4430
5	2860	8950	8100	5750	5550	5150	27200	14700	6350	12300	8000	4420
6	2860	8850	8350	5350	5600	5150	31800	14400	6000	12900	7850	4460
7	2840	8650	8350	5200	5550	5250	36600	13900	5900	13000	7550	4390
8	2870	9000	8050	5100	5500	5350	38200	12200	5550	13000	6950	4260
9	2950	8950	8000	4990	5500	5350	38100	11800	5350	12700	6900	4380
10	2890	8800	8100	4850	5450	5400	37300	12600	5450	12600	6750	4200
11	2810	8400	8150	4790	5500	5450	36300	12000	5300	12100	6500	4250
12	2590	7800	8150	4770	5500	5500	34300	11800	4990	11900	6200	4300
13	2720	7150	7950	4820	5450	5450	32100	11500	4800	12100	6000	4220
14	2470	6100	7700	4970	5450	5350	30000	11300	4490	11800	5850	4210
15	2830	5500	7300	4990	5450	5350	28600	10800	4590	12200	5650	4220
16	2670	5850	7400	5050	5400	5400	27200	10700	4490	12600	5550	4380
17	3460	7200	7100	5250	5450	5450	26100	10200	4480	12300	5400	4430
18	3640	7000	6900	5350	5450	5450	25000	10200	4510	11900	5100	4260
19	3800	7300	6650	5400	5450	5450	24500	9950	4400	11200	5350	4510
20	4760	7700	6750	5450	5450	5550	23700	9400	4310	10600	5800	4480
21	5050	7600	6750	5550	5450	5550	23100	8850	4130	10400	5350	4510
22	5250	8050	6850	5550	5450	5500	21600	8850	4340	10100	5100	4800
23	5700	7850	6750	5600	5500	5500	21000	8450	4200	9700	5450	4890
24	5700	7550	6700	5550	5500	5500	20300	8800	4580	9250	5550	4550
25	5850	7700	6600	5500	5550	5550	19700	9250	4930	9650	5400	4520
26	6000	7450	6450	5450	5550	5600	19300	9200	5350	9400	5300	4720
27	6100	7800	6350	5500	5450	5800	18800	8850	5900	9650	5400	4390
28	6000	7700	6250	5450	5450	6150	18300	8650	6750	10500	5450	4630
29	6500	7950	6200	5450	---	6850	17900	8950	7400	10100	5350	4580
30	7100	8250	6150	5400	---	8400	17400	8550	8600	9750	5100	4390
31	7450	---	6050	5300	---	8950	---	8100	---	9350	5000	---
TOTAL	127250	233700	226200	166480	153450	177000	763000	347350	165390	346800	194950	134200
MEAN	4105	7790	7297	5370	5480	5710	25430	11200	5513	11190	6289	4473
MAX	7450	9000	8400	6100	5600	8950	38200	16700	8600	13000	9100	4960
MIN	2470	5500	6050	4770	5350	5150	10500	8100	4130	9250	5000	4200
AC-FT	252400	463500	448700	330200	304400	351100	1513000	689000	328100	687900	386700	266200
CFM	.35	.67	.63	.46	.47	.49	2.19	.97	.48	.96	.54	.39
IN.	.41	.75	.73	.53	.49	.57	2.45	1.11	.53	1.11	.63	.43

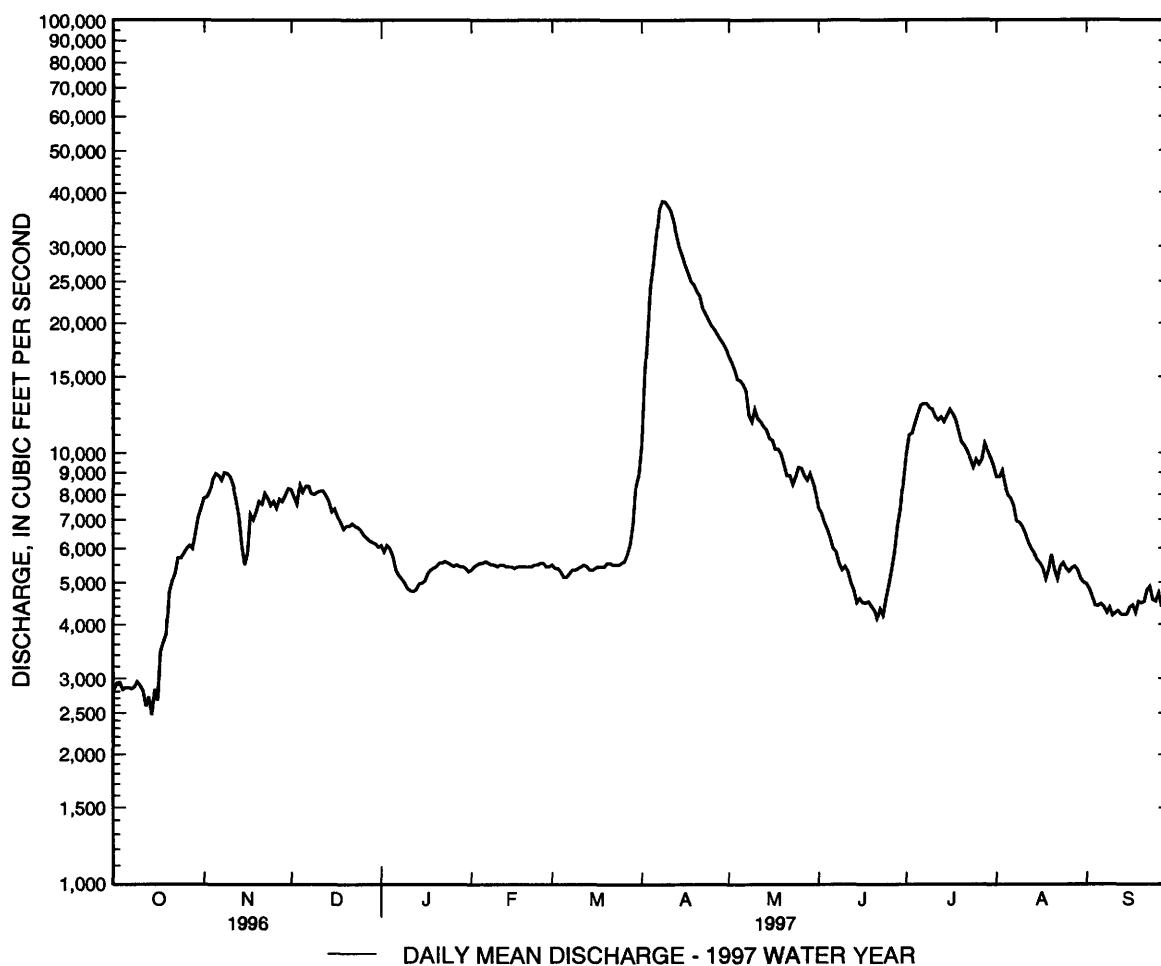
UPPER MISSISSIPPI RIVER BASIN

05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1924 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	4113	3901	3058	2711	2598	3801	9226	8624	6388	4845	3677	3546
MAX	12930	14640	7297	5713	5480	12290	25430	24600	18160	15250	15230	12940
(WY)	1966	1972	1997	1966	1997	1966	1997	1950	1965	1993	1953	1986
MIN	632	618	627	534	758	968	1924	1663	1071	648	449	535
(WY)	1937	1937	1935	1935	1937	1940	1931	1977	1988	1988	1934	1934

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1924 - 1997	
ANNUAL TOTAL	2637440		3036220			
ANNUAL MEAN	7206		8318		4734	
HIGHEST ANNUAL MEAN					9555	
LOWEST ANNUAL MEAN					1213	
HIGHEST DAILY MEAN	22800		Apr 23		38200	
LOWEST DAILY MEAN	1960		Sep 25		254	
ANNUAL SEVEN-DAY MINIMUM	2180		Sep 20		358	
ANNUAL RUNOFF (AC-FT)	5231000		6022000		3430000	
ANNUAL RUNOFF (CFSM)	.62		.72		.41	
ANNUAL RUNOFF (INCHES)	8.46		9.74		5.55	
10 PERCENT EXCEEDS	14700		13400		9760	
50 PERCENT EXCEEDS	6070		6000		3420	
90 PERCENT EXCEEDS	2870		4400		1300	



UPPER MISSISSIPPI RIVER BASIN

05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN--Continued
(National Water-Quality Assessment Station)

PERIOD OF RECORD.--Water years 1963-66, 1975 to current year, NASQAN discontinued.

PERIOD OF DAILY RECORD:

WATER TEMPERATURES.-- May 1996 to current year.

INSTRUMENTATION.-- Water-temperature monitor since May 1996.

REMARKS.-- Samples collected and sensor located at Co. Rd. 26 bridge 3.2 mi west of Royalton. Records represent water temperature at sensor within 0.5 °C;

Temperature at the sensor was compared with the average for the river by temperature cross section on Oct. 1, Nov. 19, Dec. 4, Apr. 21, May 6, June 5 and 10, July 2 and 18, Aug. 21, and Sept. 10. Variation was within 0.5 °C.

EXTREMES FOR PERIOD OF DAILY RECORD:

WATER TEMPERATURES.-- Maximum, 27.0 °C, June 30, 1996; minimum, 0.0 °C, on many days during winter.

EXTREMES FOR CURRENT YEAR:

WATER TEMPERATURES.-- Maximum 26.5 °C, July 18; minimum, 0.0 °C, on many days during winter

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	15.5	12.5	13.5	3.5	2.5	3.0	.0	.0	.0	---	---	---
2	14.0	12.5	13.0	2.5	2.0	2.0	.0	.0	.0	---	---	---
3	14.5	12.0	13.0	2.5	1.5	2.0	.0	.0	.0	---	---	---
4	14.0	12.0	13.0	2.5	2.0	2.5	---	---	---	---	---	---
5	14.5	12.0	13.0	3.0	2.5	2.5	---	---	---	---	---	---
6	12.0	11.5	12.0	3.0	3.0	3.0	---	---	---	---	---	---
7	13.0	11.0	12.0	3.0	2.5	3.0	---	---	---	---	---	---
8	13.5	11.5	12.5	2.5	2.5	2.5	---	---	---	---	---	---
9	13.0	11.5	12.0	2.5	1.5	2.0	---	---	---	---	---	---
10	12.5	10.5	11.5	1.5	1.0	1.5	---	---	---	---	---	---
11	12.0	10.0	11.0	1.0	.5	.5	---	---	---	---	---	---
12	12.0	10.0	11.0	.5	.0	.5	---	---	---	---	---	---
13	12.5	10.0	11.0	.5	.0	.0	---	---	---	---	---	---
14	12.5	10.5	11.0	.5	.0	.0	---	---	---	---	---	---
15	12.5	10.5	11.5	.0	.0	.0	---	---	---	---	---	---
16	13.0	11.0	12.0	.5	.0	.0	---	---	---	---	---	---
17	12.0	10.5	11.5	.5	.0	.0	---	---	---	---	---	---
18	11.0	10.0	10.5	.5	.0	.0	---	---	---	---	---	---
19	10.5	9.0	9.5	.0	.0	.0	---	---	---	---	---	---
20	9.0	8.0	8.5	.0	.0	.0	---	---	---	---	---	---
21	9.0	8.0	8.0	.0	.0	.0	---	---	---	---	---	---
22	8.5	8.0	8.5	.0	.0	.0	---	---	---	---	---	---
23	8.0	7.5	8.0	.0	.0	.0	---	---	---	---	---	---
24	7.5	7.0	7.0	.0	.0	.0	---	---	---	---	---	---
25	7.5	7.0	7.0	.0	.0	.0	---	---	---	---	---	---
26	7.5	7.0	7.0	.0	.0	.0	---	---	---	---	---	---
27	8.0	7.5	8.0	.0	.0	.0	---	---	---	---	---	---
28	8.5	7.5	8.0	.0	.0	.0	---	---	---	---	---	---
29	7.5	7.0	7.0	.0	.0	.0	---	---	---	---	---	---
30	7.0	5.5	6.0	.0	.0	.0	---	---	---	---	---	---
31	5.5	3.5	4.5	---	---	---	---	---	---	---	---	---
MONTH	15.5	3.5	10.1	3.5	.0	.8	---	---	---	---	---	---

UPPER MISSISSIPPI RIVER BASIN

05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	---	---	---	---	---	---	---	---	---	11.5	11.0	11.0
2	---	---	---	---	---	---	---	---	---	12.0	11.0	11.5
3	---	---	---	---	---	---	---	---	---	11.5	11.0	11.0
4	---	---	---	---	---	---	---	---	---	12.0	11.0	11.5
5	---	---	---	---	---	---	---	---	---	13.0	11.5	12.0
6	---	---	---	---	---	---	---	---	---	12.5	11.5	12.0
7	---	---	---	---	---	---	---	---	---	13.0	12.0	12.5
8	---	---	---	---	---	---	---	---	---	12.0	11.5	12.0
9	---	---	---	---	---	---	---	---	---	12.5	11.0	11.5
10	---	---	---	---	---	---	---	---	---	13.0	11.0	12.0
11	---	---	---	---	---	---	---	---	---	12.5	11.5	12.5
12	---	---	---	---	---	---	---	---	---	11.5	10.5	11.0
13	---	---	---	---	---	---	---	---	---	11.5	10.5	11.0
14	---	---	---	---	---	---	---	---	---	10.5	9.5	10.0
15	---	---	---	---	---	---	---	---	---	10.5	9.5	10.0
16	---	---	---	---	---	---	---	---	---	11.5	9.5	10.5
17	---	---	---	---	---	---	---	---	---	13.0	10.5	11.5
18	---	---	---	---	---	---	---	---	---	13.0	12.0	12.5
19	---	---	---	---	---	---	---	---	---	13.0	12.5	12.5
20	---	---	---	---	---	---	---	---	---	13.0	11.5	12.5
21	---	---	---	---	---	---	---	---	---	14.5	11.5	13.0
22	---	---	---	---	---	---	9.5	9.0	9.0	14.0	13.0	13.5
23	---	---	---	---	---	---	10.0	9.5	9.5	13.5	13.0	13.5
24	---	---	---	---	---	---	10.0	9.5	9.5	13.5	13.0	13.0
25	---	---	---	---	---	---	10.5	10.0	10.5	14.0	12.5	13.0
26	---	---	---	---	---	---	11.0	10.5	10.5	14.5	13.0	13.5
27	---	---	---	---	---	---	11.0	10.5	11.0	15.0	13.5	14.0
28	---	---	---	---	---	---	11.5	11.0	11.5	14.5	14.0	14.5
29	---	---	---	---	---	---	12.5	11.5	12.0	14.5	14.0	14.5
30	---	---	---	---	---	---	12.0	11.0	11.5	16.0	14.0	15.0
31	---	---	---	---	---	---	---	---	---	17.5	15.0	16.0
MONTH	---	---	---	---	---	---	---	---	---	17.5	9.5	12.4

UPPER MISSISSIPPI RIVER BASIN

05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	19.0	17.0	18.0	25.0	23.5	24.5	25.0	23.5	24.0	23.0	21.5	22.0
2	19.5	18.0	18.5	24.5	22.5	23.5	25.5	23.0	24.0	23.5	21.5	22.0
3	20.0	18.5	19.0	22.5	21.0	22.0	26.0	24.0	25.0	22.5	20.5	21.5
4	20.5	19.0	19.5	21.5	20.5	21.0	26.0	24.5	25.0	22.0	20.5	21.0
5	21.0	19.5	20.0	22.0	20.5	21.0	25.5	24.5	25.0	22.0	20.0	21.0
6	21.5	20.0	20.5	21.0	20.0	20.5	25.5	24.0	24.5	21.5	20.0	20.5
7	22.0	20.5	21.0	20.5	19.5	20.0	25.5	23.5	24.5	21.5	20.0	20.5
8	22.5	20.5	21.5	19.5	18.5	19.0	26.0	24.0	24.5	22.0	20.5	21.0
9	23.0	21.0	22.0	19.5	18.5	19.0	24.5	23.5	24.0	21.5	20.0	20.5
10	23.5	21.0	22.0	20.5	18.5	19.5	24.0	22.5	23.0	22.0	19.5	20.5
11	24.5	21.5	22.5	21.0	19.5	20.5	23.5	21.5	22.0	22.0	20.0	20.5
12	24.0	22.0	23.0	22.5	20.5	21.5	23.0	21.5	22.0	21.0	19.5	20.0
13	24.5	22.5	23.0	23.0	21.5	22.0	23.5	21.5	22.0	20.5	19.5	20.0
14	24.5	22.0	23.0	24.0	22.0	23.0	21.5	20.5	21.0	20.5	19.0	20.0
15	24.5	22.5	23.0	24.5	22.5	23.5	21.5	20.5	21.0	20.0	19.5	19.5
16	24.0	22.0	23.0	25.5	23.5	24.5	21.5	20.0	20.5	20.0	19.5	19.5
17	23.0	21.5	22.0	26.0	24.5	25.5	20.0	19.5	19.5	20.5	19.0	19.5
18	21.5	21.0	21.5	26.5	25.5	26.0	20.5	19.0	20.0	21.0	19.0	19.5
19	22.5	20.5	21.5	25.5	24.5	25.0	19.5	19.0	19.0	20.0	18.5	19.0
20	23.0	20.5	21.5	24.5	24.0	24.0	20.5	19.0	19.5	19.5	18.0	18.5
21	23.5	21.0	22.0	25.0	24.0	24.5	20.5	18.5	19.0	19.0	17.0	17.5
22	24.0	22.0	22.5	24.0	23.0	24.0	20.5	18.5	19.5	17.0	16.5	17.0
23	25.0	22.0	23.5	23.0	22.5	22.5	21.5	19.0	20.0	18.0	16.0	16.5
24	25.0	23.5	23.5	23.0	22.0	22.5	22.0	20.0	21.0	17.5	15.5	16.0
25	25.0	23.5	24.0	24.0	22.5	23.0	22.0	20.5	21.0	18.0	16.0	16.5
26	25.0	23.5	24.0	25.5	23.5	24.0	23.0	21.0	22.0	18.0	16.0	16.5
27	25.5	23.5	24.0	25.5	24.5	25.0	23.5	21.5	22.0	18.5	16.5	17.0
28	24.5	24.0	24.0	25.5	24.0	25.0	24.0	21.5	22.5	17.5	16.5	17.0
29	24.5	23.0	24.0	25.5	24.0	24.5	22.5	22.0	22.5	16.5	16.0	16.0
30	24.5	22.5	23.5	25.5	24.0	24.5	23.5	22.0	22.5	17.0	15.0	15.5
31	---	---	---	24.5	24.0	24.5	23.5	21.0	22.0	---	---	---
MONTH	25.5	17.0	22.0	26.5	18.5	22.9	26.0	18.5	22.1	23.5	15.0	19.1

UPPER MISSISSIPPI RIVER BASIN

05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS-CHARGE,,	SPE-CIFIC	SPE-CIFIC	PH	PH	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN,	OXYGEN,	
		INST. CUBIC FEET PER SECOND (00061)	CON- DUCT- ANCE LAB (US/CM) (00095)	CON- DUCT- ANCE LAB (US/CM) (90095)	WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	WATER WHOLE LAB (STAND- ARD UNITS) (00403)		DIS- SOLVED (MG/L) (00300)	DIS- SOLVED (PER- CENT SATUR- ATION) (00301)		
OCT 01...	1010	--	315	323	8.1	8.0	13.0	731	9.9	98	
NOV 19...	1100	6700	256	276	7.7	7.9	0.5	749	13.3	93	
DEC 04...	0955	--	274	287	7.5	7.6	0.0	--	10.4	74	
JAN 14...	1100	--	203	298	7.2	7.5	0.0	746	9.9	69	
FEB 04...	1100	--	197	314	7.3	7.6	0.0	751	8.7	61	
MAR 03...	1100	--	318	340	7.2	7.6	0.0	735	9.4	67	
APR 07...	1217	32700	191	199	7.6	7.6	0.0	740	10	70	
21...	1145	--	192	199	7.7	7.7	8.5	732	11.4	101	
MAY 06...	1310	13800	212	215	8.0	7.9	12.5	739	10.5	101	
JUN 05...	1145	--	281	277	8.1	8.2	20.5	735	8.9	102	
10...	1120	--	293	290	8.3	8.1	22.5	743	8.9	106	
JUL 02...	1230	--	277	275	7.9	8.0	24.0	725	7.6	95	
18...	1148	11300	257	250	7.8	7.9	26.0	733	7.4	95	
AUG 21...	1120	--	305	306	8.2	8.2	19.0	741	9.7	109	
SEP 10...	1055	--	313	304	8.2	8.3	20.5	740	8.3	95	
DATE		HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
OCT 01...	150	146	153	178	0	<0.015	<0.010	0.40	0.40	0.110	
NOV 19...	130	108	129	132	0	0.040	<0.010	0.60	0.80	0.200	
DEC 04...	140	127	137	155	0	0.100	<0.010	0.60	0.70	0.160	
JAN 14...	140	142	147	173	0	0.080	0.010	0.50	0.60	0.190	
FEB 04...	160	144	154	176	0	0.060	0.040	0.50	0.60	0.290	
MAR 03...	170	165	168	201	0	0.080	<0.010	0.50	0.50	0.310	
APR 07...	90	74	90	90	0	0.190	0.010	0.70	1.0	0.350	
21...	95	85	93	104	0	0.100	<0.010	0.50	0.60	0.100	
MAY 06...	110	97	104	118	0	<0.015	<0.010	0.46	0.56	0.067	
JUN 05...	140	136	137	166	0	<0.015	<0.010	0.30	0.60	<0.050	
10...	150	144	143	176	0	<0.015	<0.010	0.41	0.58	0.115	
JUL 02...	130	126	132	154	0	<0.015	0.011	0.67	0.82	0.167	
18...	130	104	122	127	0	<0.015	<0.010	0.87	0.91	0.129	
AUG 21...	150	128	149	156	0	<0.015	0.012	0.57	0.55	0.146	
SEP 10...	150	145	155	177	0	<0.015	<0.010	0.34	0.54	0.068	

UPPER MISSISSIPPI RIVER BASIN
05267000 MISSISSIPPI RIVER NEAR ROYALTON, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)
OCT 01...	<0.010	<0.010	<0.010	7.9	0.40	38	14	6.7	0.2	1.7
NOV 19...	0.040	0.020	0.020	11	0.40	34	11	5.1	0.2	1.9
DEC 04...	0.020	<0.010	0.020	10	0.50	35	12	5.1	0.2	1.6
JAN 14...	0.020	<0.010	<0.010	7.7	0.30	38	12	5.1	0.2	1.6
FEB 04...	0.060	<0.010	<0.010	8.1	0.30	41	14	5.7	0.2	1.6
MAR 03...	0.040	<0.010	<0.010	7.6	0.50	44	14	6.0	0.2	1.6
APR 07...	0.160	0.020	0.030	9.1	--	24	7.2	3.3	0.2	2.4
21...	0.040	0.020	0.010	11	0.20	26	7.4	3.0	0.1	1.8
MAY 06...	0.012	<0.010	<0.010	11	0.30	29	8.4	3.7	0.2	1.6
JUN 05...	0.010	<0.010	<0.010	9.3	0.60	35	12	4.8	0.2	1.4
10...	<0.010	<0.010	<0.010	8.7	1.0	37	13	5.2	0.2	1.5
JUL 02...	0.045	0.013	0.019	12	0.80	35	12	5.0	0.2	1.4
18...	0.029	0.022	0.021	14	1.2	34	10	4.1	0.2	1.1
AUG 21...	0.029	0.025	0.011	9.0	0.30	39	13	5.3	0.2	1.2
SEP 10...	0.012	<0.010	<0.010	7.7	0.30	38	14	5.8	0.2	1.5
DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 01...	6.4	9.4	0.10	8.9	17	3.0	188	173	14	70
NOV 19...	5.1	6.9	0.10	10	95	33	172	140	16	85
DEC 04...	4.7	5.8	0.10	11	150	25	173	153	10	82
JAN 14...	3.9	5.7	<0.10	11	200	32	181	164	11	93
FEB 04...	4.1	6.2	0.10	12	200	30	189	173	15	94
MAR 03...	5.1	6.6	0.10	13	150	47	200	191	4	94
APR 07...	4.1	4.6	<0.10	8.1	280	92	131	101	70	95
21...	3.3	4.9	<0.10	9.1	210	22	128	108	16	84
MAY 06...	3.5	4.0	<0.10	6.7	190	24	145	115	8	98
JUN 05...	4.2	4.9	0.12	5.8	43	3.0	174	149	6	91
10...	4.7	5.5	0.10	6.8	20	2.9	170	161	9	96
JUL 02...	4.2	5.0	0.12	9.1	66	16	187	148	21	100
18...	2.9	3.4	0.11	11	170	9.2	171	129	17	97
AUG 21...	4.3	5.8	0.11	12	39	6.7	200	158	5	92
SEP 10...	4.7	5.0	<0.10	11	14	1.2	192	168	7	83

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SAUK RIVER BASIN

05270500 SAUK RIVER NEAR ST. CLOUD, MN

LOCATION.--Lat 45°33'35", long 94°14'00", in SW¹/₄SW¹/₄ sec. 8, T. 124 N., R. 28 W., Stearns County, Hydrologic Unit 07010203, on right bank 0.5 mi northwest of Waite Park, 3 mi west of St. Cloud, and 5 mi upstream from mouth.

DRAINAGE AREA.--925 mi².

PERIOD OF RECORD.--July 1909 to December 1912, April to December 1913, May to November 1929, March 1930 to September 1931, April to November 1932, March to November 1933, March 1934 to September 1981, October 1990 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORD--WSP 895: Drainage area. WSP 1308: 1912(M), 1932 (M). WSP 1508: 1937(m).

GAGE.--Water-stage recorder. Datum of gage is 1,034.63 ft above mean sea level. Prior to Nov. 22, 1934, nonrecording gage on highway bridge 1 mi downstream at datum 6.77 ft lower.

REMARKS:--Records good except those for estimated daily discharge, which are fair to poor. Flow regulated by power plants and reservoirs above station.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	153	302	e289	e222	e155	e190	1590	1350	458	280	526	381
2	162	289	e285	e230	e159	e191	2550	1310	442	336	520	390
3	151	277	e282	e232	e162	e192	3880	1270	424	367	537	374
4	143	281	e280	e230	e167	e193	4570	1220	421	369	476	372
5	147	294	e280	e228	e167	e194	4910	1170	406	398	437	362
6	155	311	e279	e226	e167	e193	5110	1090	384	435	438	345
7	143	327	e279	e223	e167	e192	5100	1020	371	455	399	326
8	138	313	e278	e220	e168	e191	4770	1030	351	523	374	316
9	139	299	e275	e218	e168	e191	4300	953	344	508	345	317
10	135	e282	e272	e216	e168	e191	4210	886	327	508	323	308
11	138	e262	e270	e213	e168	e191	4300	875	312	496	288	295
12	139	e254	e269	e211	e168	e190	4150	838	301	475	273	287
13	130	e232	e269	e210	e168	e190	3860	800	286	464	260	280
14	119	e350	e271	e204	e168	e190	3520	790	263	484	249	274
15	132	e500	e270	e194	e168	e190	3220	766	262	490	252	269
16	145	e505	e268	e187	e169	e191	2950	745	248	500	252	279
17	187	e370	e260	e182	e171	e195	2730	718	227	505	234	303
18	257	e360	e255	e178	e174	e196	2530	726	222	484	225	287
19	205	e360	e252	e172	e177	e196	2360	707	211	488	316	290
20	199	e345	e248	e168	e180	e196	2200	670	212	492	384	281
21	238	e345	e243	e163	e183	e196	2090	631	212	493	359	265
22	266	e345	e241	e162	e186	e197	1970	598	208	492	358	263
23	280	e340	e238	e164	e188	e199	1870	571	209	498	364	252
24	301	e335	e227	e165	e189	e202	1790	549	254	490	370	244
25	280	e310	e220	e162	e189	e222	1710	508	299	856	363	247
26	278	e280	e211	e160	e189	e265	1630	483	248	787	367	226
27	300	e265	e209	e158	e189	e310	1590	476	238	741	360	221
28	280	e268	e210	e156	e190	e390	1540	470	231	699	345	241
29	275	e281	e210	e154	---	528	1490	483	263	652	363	240
30	382	e291	e210	e152	---	792	1430	473	267	604	363	212
31	343	---	e212	e152	---	1060	---	468	---	559	360	---
TOTAL	6340	9573	7862	5912	4862	8204	89920	24644	8901	15928	11080	8747
MEAN	205	319	254	191	174	265	2997	795	297	514	357	292
MAX	382	505	289	232	190	1060	5110	1350	458	856	537	390
MIN	119	232	209	152	155	190	1430	468	208	280	225	212
AC-FT	12580	18990	15590	11730	9640	16270	178400	48880	17660	31590	21980	17350
CFSM	.22	.34	.27	.21	.19	.29	3.24	.86	.32	.56	.36	.32

e Estimated

SAUK RIVER BASIN

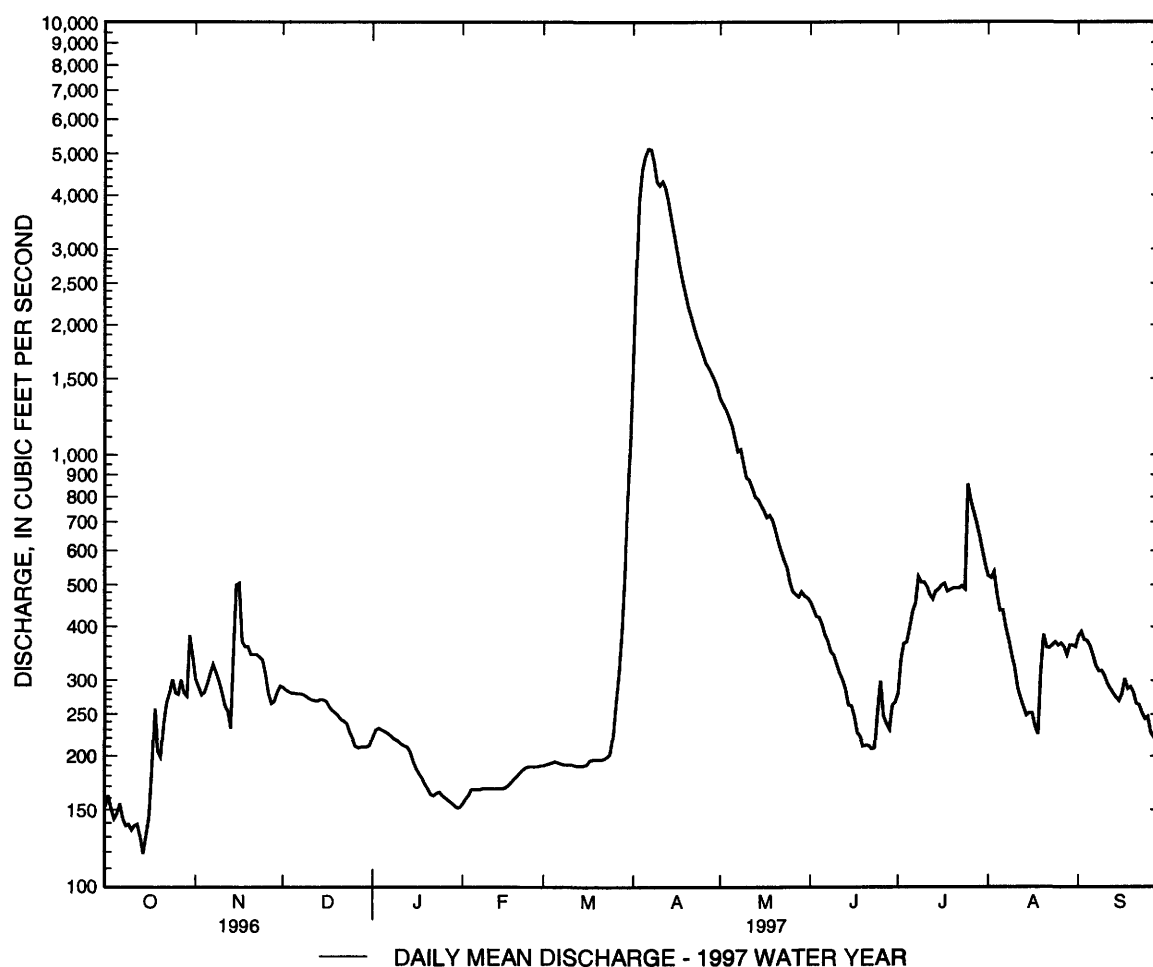
05270500 SAUK RIVER NEAR ST. CLOUD, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	171	178	135	99.6	106	313	830	506	410	318	206	182
MAX	1154	1091	528	336	568	1380	2997	1572	1333	1262	1250	1136
(WY)	1996	1972	1972	1980	1966	1966	1997	1975	1957	1993	1972	1957
MIN	6.22	6.18	5.15	3.25	7.61	28.7	16.5	7.84	15.9	10.6	10.5	10.7
(WY)	1934	1934	1935	1935	1935	1940	1934	1934	1934	1934	1933	1933

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1909 - 1997	
ANNUAL TOTAL	175253		201973			
ANNUAL MEAN	479		553		304 ^a	
HIGHEST ANNUAL MEAN					732	
LOWEST ANNUAL MEAN					51.0	
HIGHEST DAILY MEAN	1690		5110		7940	
LOWEST DAILY MEAN	77		119		1.3	
ANNUAL SEVEN-DAY MINIMUM	80		133		1.5	
INSTANTANEOUS PEAK FLOW			5150		9100	
INSTANTANEOUS PEAK STAGE			8.72		10.68	
INSTANTANEOUS LOW FLOW			103		.30	
ANNUAL RUNOFF (AC-FT)	347600		400600		220400	
ANNUAL RUNOFF (CFSM)	.52		.60		.33	
10 PERCENT EXCEEDS	1320		1070		730	
50 PERCENT EXCEEDS	271		280		138	
90 PERCENT EXCEEDS	136		168		36	

a Median of annual mean discharges is 288 ft³/s.



SAUK RIVER BASIN

05270500 SAUK RIVER NEAR ST. CLOUD, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (MG/L) (00300)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
APR 02...	1407	2650	362	7.5	1.0	742	10.7	77	146	178	

DATE	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHOS- SOLVED (MG/L AS P) (00671)	SED- IMENT, SUS- PENDE (MG/L) (80154)	SEI- SUS? SIEVE DIA 1/4 % FINER THAN .062 MM (7031)
APR 02...	0	0.830	0.060	1.6	2.1	1.50	0.340	0.210	0.180	35	59

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UPPER MISSISSIPPI RIVER BASIN

05270700 MISSISSIPPI RIVER AT ST. CLOUD, MN

LOCATION.--Lat 45°32'50", long 94°08'44", in SE¹/₄SW¹/₄ sec. 1, T. 35 N., R. 31 W., Sherburne County, Hydrologic Unit 07010203, on left bank about 250 ft below the left downstream end of the City of St. Cloud hydropower dam and at mile 926.3 upstream from Ohio River.

DRAINAGE AREA.--13,320 mi², approximately.

PERIOD OF RECORD.--October 1988 to current year.

GAGE.--Water-stage recorder. Datum of gage is 958.49 ft above sea level.

REMARKS.--Records fair.. Flow partly regulated by power plants and reservoirs.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3010	8230	8730	e6600	e5500	e5800	13700	18200	8000	10700	10700	5660
2	2990	8500	7720	e6300	e5600	e5750	20500	17900	7850	12100	10900	5300
3	3140	8570	7350	e6700	e5700	e5700	25500	17200	7240	11800	11500	5240
4	2950	9220	8760	e6600	e5800	e5500	31700	16200	6990	12500	10400	4890
5	3080	9660	8290	e6200	e5900	e5300	32800	16200	6580	13000	9700	4870
6	2990	9470	8860	e5700	e5900	e5300	37200	15400	6220	13800	9430	4970
7	2940	9160	8470	e5500	e5880	e5500	43200	15700	6110	14100	9210	4880
8	3010	9590	8060	e5400	e5860	e5600	44900	14000	5960	14000	8180	4660
9	3130	9500	8250	e5200	e5840	e5700	45100	12600	5410	13700	8330	4890
10	3160	9240	8200	e5000	e5820	e5800	43700	14100	5740	13700	8040	4500
11	3090	8910	8600	e4900	e5800	e5900	42300	13300	5740	13000	7710	4450
12	2650	8080	8820	e4800	e5780	e5900	40200	13100	5260	12800	7330	4810
13	3040	7450	8250	e4900	e5750	e5800	37900	12800	5170	13200	7010	4670
14	2420	6060	7460	e5100	e5720	e5700	35100	12600	4690	12700	6960	4640
15	3150	5380	6950	e5200	e5700	e5700	33400	12000	4930	13000	6630	4640
16	2910	6390	7000	e5200	e5700	e5800	31600	11900	4740	13700	6520	4910
17	3820	8240	6420	e5400	e5750	e5850	30200	11200	4890	13200	6330	5050
18	4030	7150	6550	e5600	e5800	e5900	28400	11500	5000	13000	5990	4590
19	3790	7740	6310	e5600	e5800	e5950	27800	11300	4800	12400	6350	5050
20	5210	7990	e6800	e5600	e5830	e6000	26700	10400	4750	11600	7130	5000
21	5440	7660	e6800	e5800	e5830	6050	e26000	9480	4290	11300	6470	4860
22	5590	8240	e6900	e5800	e5870	6000	e23500	9800	4640	11000	5940	5230
23	6160	8010	e6900	e5900	e5870	6000	e23000	9230	4500	10600	6380	5530
24	5950	7650	e6900	e5800	e5900	5870	e22100	9580	4980	10000	6400	4990
25	6140	7460	e6900	e5750	e5900	5950	21400	10100	5280	11000	6240	4910
26	6370	7270	e6800	e5700	e5850	6020	21000	10100	5330	10500	6030	5330
27	6430	7800	e6800	e5700	e5850	6300	20500	9780	5950	11100	6050	4830
28	6240	7650	e6700	e5650	e5800	6830	19900	9290	7370	13000	6070	5070
29	6920	8260	e6700	e5600	---	7360	19600	9890	7780	12300	6140	5220
30	7610	8770	e6700	e5500	---	9410	19100	9300	9180	11900	5700	4890
31	7930	---	e6500	e5400	---	11400	---	8900	---	11700	5670	---
TOTAL	135290	243300	230450	174100	162300	191640	888000	383050	175370	382400	231440	148530
MEAN	4364	8110	7434	5616	5796	6182	29600	12360	5846	12340	7466	4951
MAX	7930	9660	8860	6700	5900	11400	45100	18200	9180	14100	11500	5660
MIN	2420	5380	6310	4800	5500	5300	13700	8900	4290	10000	5670	4450
AC-FT	268300	482600	457100	345300	321900	380100	1761000	759800	347800	758500	459100	294600
CFSM	.33	.61	.56	.42	.44	.46	2.22	.93	.44	.93	.56	.37
IN.	.38	.68	.64	.49	.45	.54	2.48	1.07	.49	1.07	.65	.41

e Estimated

UPPER MISSISSIPPI RIVER BASIN

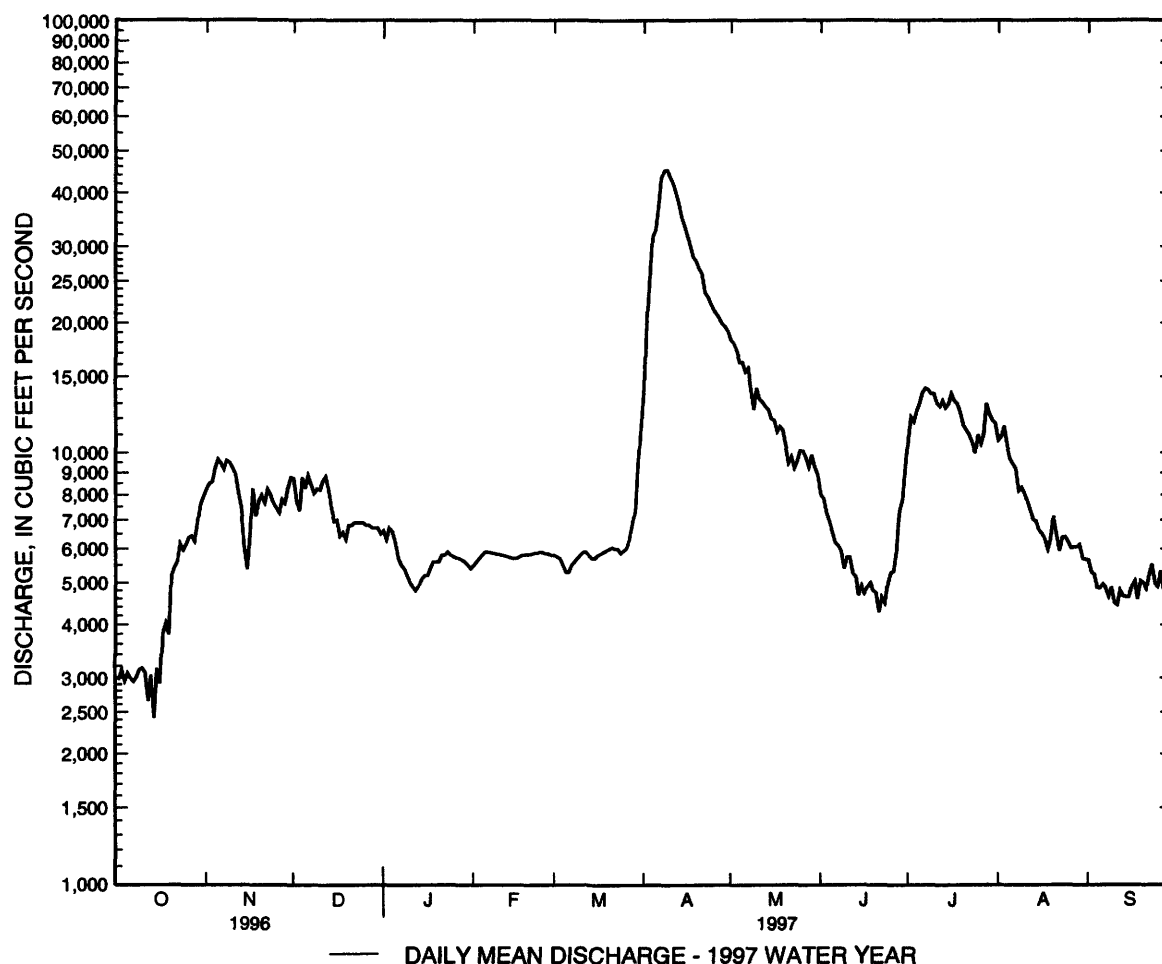
05270700 MISSISSIPPI RIVER AT ST. CLOUD, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	5717	5515	4420	3921	3739	6660	14100	11620	7377	8269	4729	4800
MAX	15680	9675	7434	5616	5796	10600	29600	17250	12730	16830	9079	7360
(WY)	1996	1996	1997	1997	1997	1995	1997	1996	1993	1993	1993	1988
MIN	3106	2953	2310	1927	1815	3860	6576	6210	3743	3930	1535	2297
(WY)	1993	1989	1991	1991	1990	1989	1990	1992	1992	1989	1989	1990

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1988 - 1997
ANNUAL TOTAL	2959050	3345870	
ANNUAL MEAN	8085	9167	6725
HIGHEST ANNUAL MEAN			9167
LOWEST ANNUAL MEAN			4615
HIGHEST DAILY MEAN	25500	Apr 22	45100
LOWEST DAILY MEAN	2120	Sep 18	2420
ANNUAL SEVEN-DAY MINIMUM	2410	Sep 18	2920
INSTANTANEOUS PEAK FLOW			46900
INSTANTANEOUS PEAK STAGE			11.44
INSTANTANEOUS LOW FLOW			1280
ANNUAL RUNOFF (AC-FT)	5869000	6637000	4872000
ANNUAL RUNOFF (CFSM)	.61	.69	.50
ANNUAL RUNOFF (INCHES)	8.26	9.34	6.86
10 PERCENT EXCEEDS	17200	14600	13000
50 PERCENT EXCEEDS	6440	6500	5500
90 PERCENT EXCEEDS	2960	4850	2510

a Result of regulation.



ELK RIVER BASIN

05275000 ELK RIVER NEAR BIG LAKE, MN

LOCATION.--Lat 45°20'02", long 93°40'00", in NE¹/₄SW¹/₄ sec. 23, T.22 N., R.27 W., Sherburne County, Hydrologic Unit 07010203, on right bank at upstream side of highway bridge, 4 mi east of Big Lake and 4 mi downstream from St. Francis River.

DRAINAGE AREA.--615 mi².

PERIOD OF RECORD.--April 1911 to September 1917, April to September 1931, April to November 1932, March to November 1933, March 1934 to September 1987, October 1990 to current year.

REVISED RECORDS.--WSP 895: 1939. WSP 1308: 1912(M), 1915-17(M).

GAGE.--Water-stage recorder. Datum of gage is 899.60 ft above mean sea level. April 1911 to Sept. 30, 1917, April 1, 1931 to July 26, 1934, nonrecording gage at same site and datum.

REMARKS.--Records good except those for periods of estimated daily discharge, which are fair.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	85	171	e270	e126	e100	e159	721	346	201	172	813	317
2	80	164	e258	e130	e107	e162	926	341	192	287	804	310
3	82	161	e248	e135	e110	e166	1260	338	187	351	810	299
4	83	153	e240	e133	e112	e168	1830	326	183	339	792	290
5	78	151	e235	e130	e115	e170	2570	314	180	338	767	287
6	75	153	e230	e124	e117	e168	3480	304	176	344	763	278
7	73	157	e227	e121	e118	e163	4020	299	171	362	753	264
8	77	155	e224	e120	e120	e167	e3850	316	166	439	738	253
9	78	150	e220	e118	e122	e175	e3500	297	154	435	710	269
10	79	e140	e220	e116	e125	e182	3110	275	148	397	671	267
11	79	e110	e218	e113	e128	e188	e2650	259	143	344	610	251
12	81	e84	e216	e110	e129	e188	e2180	253	137	290	544	239
13	78	e84	e215	e107	e130	e182	e1860	247	131	262	488	229
14	79	e95	e211	e103	e129	e173	e1530	244	124	261	446	224
15	79	140	e206	e101	e127	e168	1300	240	116	255	421	220
16	79	225	e195	e100	e127	e168	1110	236	115	239	390	229
17	107	406	e184	e98	e134	e176	954	232	113	225	361	240
18	140	e438	e172	e96	e140	e181	817	248	113	207	329	227
19	137	e430	e159	e94	e147	e186	694	254	115	210	360	222
20	124	419	e150	e94	e152	e185	608	249	111	238	450	225
21	116	415	e142	e95	e155	e185	546	240	103	259	451	226
22	115	e430	e141	e98	e152	e183	500	232	98	305	452	220
23	128	e442	e139	e98	e150	e180	458	226	97	440	455	213
24	145	e420	e135	e96	e149	e182	434	226	94	545	465	205
25	145	e360	e130	e94	e150	e186	422	229	96	613	465	198
26	138	e318	e125	e91	e152	e203	408	222	93	613	449	191
27	145	e292	e121	e89	e155	e235	394	211	90	642	418	185
28	142	e285	e120	e87	e157	e290	380	205	102	670	385	176
29	155	e282	e121	e86	---	e380	369	214	149	715	366	172
30	191	e278	e123	e89	---	e480	356	220	168	780	351	168
31	194	---	e125	e95	---	606	---	211	---	809	332	---
TOTAL	3387	7508	5720	3287	3709	6585	43237	8054	4066	12386	16609	7094
MEAN	109	250	185	106	132	212	1441	260	136	400	536	236
MAX	194	442	270	135	157	606	4020	346	201	809	813	317
MIN	73	84	120	86	100	159	356	205	90	172	329	168
AC-FT	6720	14890	11350	6520	7360	13060	85760	15980	8060	24570	32940	14070
CFSM	.18	.41	.30	.17	.22	.35	2.34	.42	.22	.65	.87	.38
IN.	.20	.45	.35	.20	.22	.40	2.62	.49	.25	.75	1.00	.43

e Estimated

ELK RIVER BASIN

05275000 ELK RIVER NEAR BIG LAKE, MN--Continued

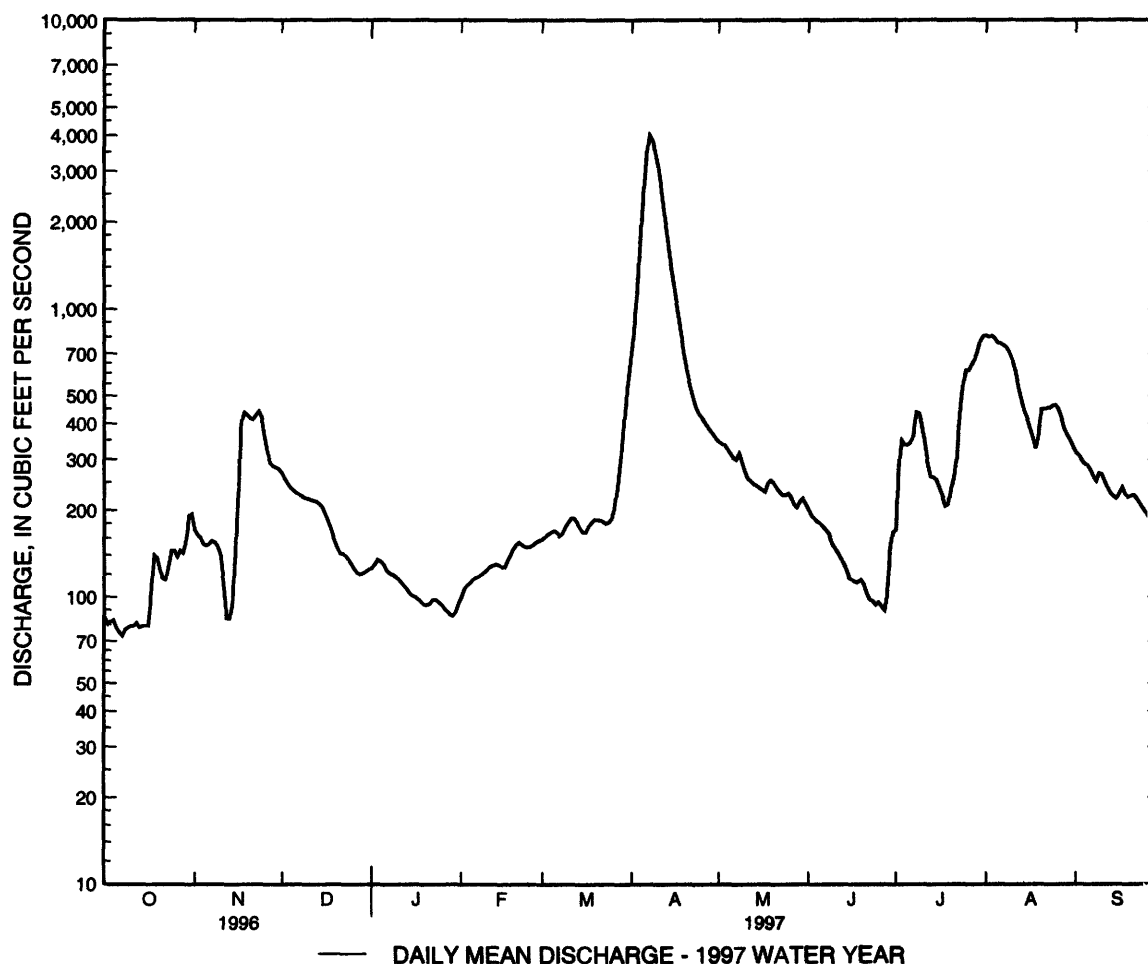
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1911 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	211	214	152	112	117	308	661	443	340	269	182	203
MAX	778	794	410	290	392	1125	1823	1620	1647	1026	926	1050
(WY)	1985	1972	1966	1979	1984	1966	1969	1986	1984	1978	1972	1986
MIN	32.7	56.3	44.1	38.4	29.8	58.8	75.5	37.5	20.5	8.94	8.74	23.4
(WY)	1934	1935	1935	1935	1936	1934	1934	1934	1934	1934	1934	1932

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1911 - 1997
ANNUAL TOTAL	103310	121642	
ANNUAL MEAN	282	333	278 ^a
HIGHEST ANNUAL MEAN			669
LOWEST ANNUAL MEAN			88.0
HIGHEST DAILY MEAN	1170	4020	7170
LOWEST DAILY MEAN	61	73	4.0
ANNUAL SEVEN-DAY MINIMUM	63	77	4.5
INSTANTANEOUS PEAK FLOW		4070	7360
INSTANTANEOUS PEAK STAGE		9.02	10.86
INSTANTANEOUS LOW FLOW		47 ^b	3.6
ANNUAL RUNOFF (AC-FT)	204900	241300	201700
ANNUAL RUNOFF (CFSM)	.46	.54	.45
ANNUAL RUNOFF (INCHES)	6.25	7.36	6.15
10 PERCENT EXCEEDS	763	611	561
50 PERCENT EXCEEDS	146	201	167
90 PERCENT EXCEEDS	82	98	68

a Median of annual mean discharges is 262 ft³/s.

b Result of freezeup.



ELK RIVER BASIN

05275000 ELK RIVER NEAR BIG LAKE, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CAO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
------	------	---	--	--	---	---	--	---	---	--

APR 02...	1134	913	257	7.4	4.0	745	10.5	82	103	126
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DATE	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MI (70331)
------	---	--	--	--	---	--	---	--	--	--	--

APR 02...	0	0.310	0.030	0.90	1.3	1.50	0.140	0.060	0.040	22	64
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CROW RIVER BASIN

05276005 NORTH FORK CROW RIVER ABOVE PAYNESVILLE, MN

LOCATION.--Lat. 45°22'38", long 94°47'00", in SW¹/₄NW¹/₄ sec. 13, T. 122 N., R. 33 W., Kandiyohi County, Hydrologic Unit 07010204, on left back at downstream end of bridge on County Highway 6, 0.8 mile south of State Highway 55, 1 mile west of Kandiyohi/Stearns County line, and 2.5 miles west of Paynesville.

DRAINAGE AREA.-- 232 mi².

PERIOD OF RECORD.-- April 1996 to current year.

GAGE.-- Water-stage recorder. Elevation of gage is 1190 ft above sea level (from topographic map).

REMARKS.-- Records good except those for estimated daily discharges, which are fair.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.7	68	e39	e21	e21	e20	923	144	70	158	114	76
2	8.2	69	e39	e22	e21	e19	1690	140	63	303	99	102
3	7.3	64	e38	22	e20	e19	1990	136	58	279	91	97
4	6.4	57	e37	e22	20	e19	1920	126	53	330	87	84
5	6.7	53	e36	e21	20	e19	1980	120	49	340	78	74
6	6.7	53	e36	e21	20	e18	2090	111	44	282	76	65
7	6.6	53	e35	e20	20	e19	1830	109	39	245	72	62
8	7.1	49	e34	e20	e20	e19	1630	122	36	263	67	64
9	7.0	46	e34	e20	e20	e20	1510	123	33	231	63	74
10	7.0	36	e33	e20	e20	e20	1320	121	30	230	61	69
11	6.9	32	e33	e20	e20	e21	1090	116	27	226	57	62
12	6.9	e30	e31	e20	e19	21	928	106	26	192	53	56
13	7.1	e29	e30	e19	e19	e20	779	101	24	159	50	52
14	7.0	e29	e28	e19	e19	e20	666	100	21	157	50	49
15	7.4	29	e26	e19	e19	e19	593	95	21	173	58	49
16	8.1	44	e25	e19	e19	e19	539	90	21	177	66	57
17	25	86	e25	e19	e19	e20	489	85	20	141	62	66
18	45	81	e24	e18	e20	e20	439	84	21	101	57	70
19	47	67	e23	e18	e20	e20	392	84	23	93	85	67
20	41	59	e23	e18	e20	e20	350	80	22	116	105	59
21	36	53	23	e19	e20	20	319	75	20	139	110	53
22	33	e48	e22	e19	e21	22	292	71	18	169	109	50
23	35	e45	e22	e19	e21	26	267	71	17	210	101	48
24	33	e42	e22	e19	e21	26	244	80	19	246	91	46
25	32	e41	e21	e19	e21	25	223	87	19	367	82	42
26	30	39	e21	e19	e21	27	206	82	17	318	75	40
27	28	38	e21	e19	e20	46	191	74	15	243	68	38
28	29	38	e21	e20	e20	91	177	71	15	207	61	38
29	35	e39	e20	e20	---	159	166	77	155	193	61	35
30	61	e39	e21	e20	---	239	155	81	175	170	67	34
31	e77	---	e21	e20	---	357	---	76	---	134	77	---
TOTAL	702.1	1456	864	611	561	1430	25388	3038	1171	6592	2353	1778
MEAN	22.6	48.5	27.9	19.7	20.0	46.1	846	98.0	39.0	213	75.9	59.3
MAX	77	86	39	22	21	357	2090	144	175	367	114	102
MIN	6.4	29	20	18	19	18	155	71	15	93	50	34
AC-FT	1390	2890	1710	1210	1110	2840	50360	6030	2320	13080	4670	3530

e Estimated

CROW RIVER BASIN

05276005 NORTH FORK CROW RIVER ABOVE PAYNESVILLE, MN.--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 1997, BY WATER YEAR (WY)

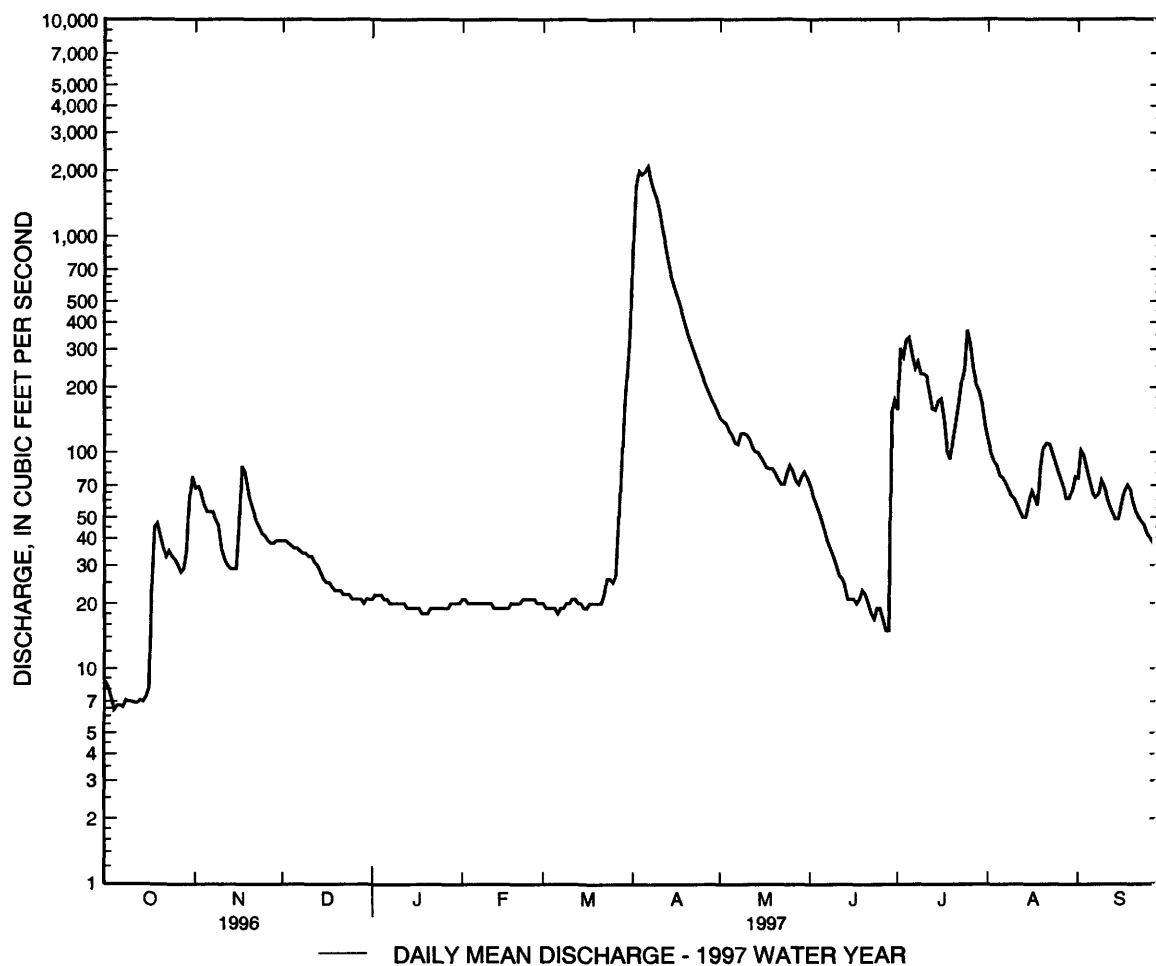
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	22.6	48.5	27.9	19.7	20.0	46.1	846	182	63.2	120	42.1	32.0
MAX	22.6	48.5	27.9	19.7	20.0	46.1	846	265	87.3	213	75.9	59.3
(WY)	1997	1997	1997	1997	1997	1997	1997	1996	1996	1997	1997	1997
MIN	22.6	48.5	27.9	19.7	20.0	46.1	846	98.0	39.0	27.1	8.25	4.68
(WY)	1997	1997	1997	1997	1997	1997	1997	1997	1997	1996	1996	1996

SUMMARY STATISTICS

FOR 1997 WATER YEAR

WATER YEARS 1996 - 1997

ANNUAL TOTAL	45944.1											
ANNUAL MEAN	126								126			
HIGHEST ANNUAL MEAN									126			1997
LOWEST ANNUAL MEAN									126			1997
HIGHEST DAILY MEAN	2090						Apr 6		2090		Apr 6	1997
LOWEST DAILY MEAN	6.4						Oct 4		2.4		Sep 15	1996
ANNUAL SEVEN-DAY MINIMUM	6.8						Oct 4		2.6		Sep 13	1996
INSTANTANEOUS PEAK FLOW	2150						Apr 6		2150		Apr 6	1997
INSTANTANEOUS PEAK STAGE	14.34						Apr 6		14.34		Apr 6	1997
INSTANTANEOUS LOW FLOW	5.4						Oct 4		2.0		Sep 1	1996
ANNUAL RUNOFF (AC-FT)	91130								91160			
10 PERCENT EXCEEDS	241								279			
50 PERCENT EXCEEDS	42								38			
90 PERCENT EXCEEDS	19								7.8			



CROW RIVER BASIN

05276005 NORTH FORK CROW RIVER ABOVE PAYNESVILLE, MN.--Continued
(National Water-Quality Assessment Station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1996 to current year.

PERIOD OF DAILY RECORD:

WATER TEMPERATURES.-- May 1996 to current year.

SPECIFIC CONDUCTANCE.-- May 1996 to current year.

INSTRUMENTATION.-- Water-quality monitor since May 1996, provides continuous recordings. Sensor located at gage.

REMARKS.--Records represent water temperature at sensor within 0.5°C. Temperature and conductance at the sensor was compared with the average for the river by cross section at least monthly. Variation of temperature was within 0.5°C; variation of conductance was within 32% (corrections applied).

EXTREMES FOR PERIOD OF DAILY RECORD:

TEMPERATURE.-- Maximum, 31.5 °C, Aug. 6, 1996; minimum 0.0 °C, many days during winter of 1997.

SPECIFIC CONDUCTANCE.-- Maximum, 855 µs/cm, Oct 31, 1996; minimum, 196 µs/cm, Apr. 4, 1997.

EXTREMES FOR CURRENT YEAR:

TEMPERATURE.-- Maximum, 29.5 °C, June 27; minimum 0.0 °C, many days during winter.

SPECIFIC CONDUCTANCE.-- Maximum, 855 µm/cm, Oct. 31; minimum, 196 µm/cm, Apr. 4.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	21.0	13.0	16.0	.5	.0	.0	.0	.0	.0	.0	.0	.0
2	16.0	9.5	12.5	1.0	.0	.0	.0	.0	.0	.0	.0	.0
3	14.5	6.5	10.0	2.5	.0	1.0	.0	.0	.0	.0	.0	.0
4	13.0	7.0	9.5	2.5	.5	1.5	.0	.0	.0	.0	.0	.0
5	19.5	9.5	13.5	4.5	2.5	3.0	.0	.0	.0	.0	.0	.0
6	15.0	10.5	13.0	5.0	3.5	4.5	.0	.0	.0	.0	.0	.0
7	16.5	8.0	11.5	5.0	2.0	3.5	.0	.0	.0	.0	.0	.0
8	14.5	7.5	11.0	3.5	2.0	2.5	.0	.0	.0	.0	.0	.0
9	14.0	8.5	10.5	2.0	.0	1.0	.0	.0	.0	.0	.0	.0
10	14.5	5.5	9.5	1.0	.0	.0	.0	.0	.0	.0	.0	.0
11	14.0	5.5	9.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
12	16.0	7.5	11.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
13	17.5	9.0	12.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	16.5	9.5	12.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
15	17.5	10.5	14.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16	15.0	10.5	12.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
17	11.0	6.5	9.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
18	8.0	4.5	6.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19	9.0	4.5	6.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
20	9.5	7.0	8.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
21	10.5	7.5	8.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	7.5	6.0	7.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
23	8.5	5.5	6.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
24	7.5	5.5	6.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
25	8.5	5.5	7.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
26	11.5	8.5	9.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
27	10.0	6.5	8.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
28	9.0	5.0	7.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
29	7.5	6.5	7.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
30	7.0	1.0	3.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
31	1.0	.0	.0	---	---	---	.0	.0	.0	.0	.0	.0
MONTH	21.0	.0	9.3	5.0	.0	.6	.0	.0	.0	.0	.0	.0

CROW RIVER BASIN

05276005 NORTH FORK CROW RIVER ABOVE PAYNESVILLE, MN.--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	.0	.0	.0	.0	.0	.0	.5	.0	.0	12.5	7.0	9.5
2	.0	.0	.0	.0	.0	.0	.5	.0	.5	11.0	9.5	10.5
3	.0	.0	.0	.0	.0	.0	3.0	.0	1.5	12.5	7.5	10.0
4	.0	.0	.0	.0	.0	.0	5.5	3.0	4.5	15.0	9.0	12.0
5	.0	.0	.0	.0	.0	.0	6.5	5.5	6.0	15.0	12.0	13.0
6	.0	.0	.0	.0	.0	.0	6.0	.0	3.0	16.5	10.5	13.5
7	.0	.0	.0	.0	.0	.0	.0	.0	.0	15.0	12.0	13.0
8	.0	.0	.0	.0	.0	.0	.5	.0	.0	12.0	8.0	10.0
9	.0	.0	.0	.0	.0	.0	1.5	.0	.5	13.0	6.5	10.0
10	.0	.0	.0	.0	.0	.0	1.0	.0	.5	15.5	9.5	13.0
11	.0	.0	.0	.0	.0	.0	2.5	.0	1.0	14.5	9.0	12.0
12	.0	.0	.0	.0	.0	.0	4.0	.5	2.0	11.0	7.0	9.0
13	.0	.0	.0	.0	.0	.0	6.5	2.0	4.0	9.5	7.5	8.0
14	.0	.0	.0	.0	.0	.0	8.5	4.0	6.5	9.5	7.0	8.0
15	.0	.0	.0	.0	.0	.0	7.5	5.5	6.5	12.0	5.5	9.0
16	.0	.0	.0	.0	.0	.0	6.5	3.0	5.0	16.0	9.0	12.5
17	.0	.0	.0	.0	.0	.0	8.5	4.0	6.0	19.0	12.5	15.5
18	.0	.0	.0	.0	.0	.0	9.0	7.0	7.5	19.5	15.5	17.0
19	.0	.0	.0	.0	.0	.0	12.0	7.0	9.5	16.0	12.0	13.5
20	.0	.0	.0	.0	.0	.0	13.0	9.5	11.5	16.5	10.0	13.0
21	.0	.0	.0	.0	.0	.0	13.5	10.5	12.0	18.0	11.5	15.0
22	.0	.0	.0	.0	.0	.0	13.0	9.0	11.0	15.5	13.5	14.0
23	.0	.0	.0	.0	.0	.0	12.5	10.0	11.5	13.5	12.5	13.0
24	.0	.0	.0	.0	.0	.0	12.0	9.0	10.5	14.5	13.0	13.5
25	.0	.0	.0	.0	.0	.0	12.5	9.0	11.0	18.0	11.5	14.5
26	.0	.0	.0	.5	.0	.0	12.5	10.0	11.0	16.5	12.0	14.5
27	.0	.0	.0	.5	.0	.0	14.5	10.5	12.5	16.5	12.0	14.5
28	.0	.0	.0	.0	.0	.0	15.0	10.5	13.0	15.0	13.0	14.0
29	---	---	---	.5	.0	.0	14.5	12.0	13.0	14.0	12.0	13.0
30	---	---	---	.0	.0	.0	12.0	9.0	10.0	19.5	11.5	15.5
31	---	---	---	.5	.0	.0	---	---	---	22.5	15.5	19.0
MONTH	.0	.0	.0	.5	.0	.0	15.0	.0	6.4	22.5	5.5	12.7

CROW RIVER BASIN

05276005 NORTH FORK CROW RIVER ABOVE PAYNESVILLE, MN.--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	23.5	18.0	20.5	24.5	21.5	22.5	25.0	19.5	22.0	25.0	21.0	22.5
2	23.0	18.5	20.5	21.5	18.0	19.5	26.5	21.5	23.5	22.0	19.0	20.5
3	21.5	19.0	20.5	18.0	16.0	17.0	27.0	22.0	24.5	21.0	17.0	19.0
4	25.0	18.5	21.5	18.5	15.0	16.5	26.5	22.5	24.5	19.5	17.0	18.0
5	25.0	19.5	22.5	19.0	16.0	17.5	25.5	21.0	23.5	22.5	17.0	19.5
6	25.0	19.0	22.0	20.0	16.5	18.0	26.0	21.5	24.0	---	---	---
7	24.5	19.0	22.0	18.5	15.5	16.5	26.5	21.0	24.0	---	---	---
8	25.0	18.5	21.5	17.0	15.0	16.0	26.0	21.5	23.5	22.0	19.0	20.5
9	25.5	19.0	22.5	19.0	15.5	17.0	23.0	20.5	21.5	21.0	18.0	19.5
10	26.0	20.0	23.0	20.5	17.0	19.0	22.5	18.0	20.0	20.5	16.0	18.5
11	25.0	20.5	23.0	23.5	19.0	21.0	22.0	18.0	20.0	21.0	16.5	18.5
12	25.0	19.5	22.5	25.0	22.0	23.5	22.0	19.5	20.5	19.5	1.0	18.0
13	26.5	19.5	23.0	27.0	23.0	24.5	22.5	17.0	20.0	20.0	17.5	18.5
14	27.0	19.0	23.0	25.0	22.5	23.5	20.0	17.5	18.0	21.0	16.5	18.5
15	24.5	20.5	22.0	26.0	21.5	23.5	21.5	17.0	19.0	21.5	19.0	20.0
16	25.0	18.0	21.0	27.5	23.0	25.0	22.5	18.0	20.5	20.0	18.0	19.5
17	21.5	18.5	20.0	28.5	24.0	26.5	20.5	18.0	19.0	20.0	16.0	18.0
18	20.0	18.0	19.0	27.0	25.0	26.0	20.5	17.0	18.5	21.5	16.5	19.0
19	25.5	17.0	21.0	25.5	22.5	24.0	18.5	17.0	17.5	20.0	16.5	18.5
20	26.5	21.5	23.0	26.0	22.5	24.0	20.0	16.5	18.0	17.5	13.5	15.5
21	27.0	20.0	23.5	25.0	22.5	23.5	21.0	16.5	19.0	16.5	12.0	14.5
22	25.0	21.0	23.0	23.0	20.5	21.5	21.0	17.5	19.0	14.5	13.0	14.0
23	29.0	20.0	24.5	23.0	20.0	21.5	22.5	18.0	20.0	16.5	11.5	14.0
24	27.5	23.0	24.5	22.0	21.0	21.5	22.5	19.5	21.0	17.0	11.5	14.5
25	26.0	20.5	23.0	24.5	21.0	22.5	24.0	19.5	21.5	19.0	13.5	16.0
26	28.0	19.5	23.5	26.0	23.0	24.5	25.5	21.0	23.0	18.0	14.5	16.5
27	29.5	21.5	25.5	26.0	23.5	24.5	26.0	22.0	23.5	20.5	16.0	17.5
28	24.5	20.0	22.5	25.0	22.5	23.5	25.0	20.5	23.0	17.5	14.5	16.0
29	20.0	17.5	19.0	24.0	21.5	23.0	23.0	20.5	22.0	15.0	12.0	13.5
30	23.0	18.5	21.0	24.0	20.5	22.5	24.5	21.0	22.5	16.5	11.5	14.0
31	---	---	---	22.0	20.0	21.0	24.5	20.0	22.0	---	---	---
MONTH	29.5	17.0	22.1	28.5	15.0	21.6	27.0	16.5	21.2	---	---	---

CROW RIVER BASIN

05276005 NORTH FORK CROW RIVER ABOVE PAYNESVILLE, MN.--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	627	457	543	702	649	678	678	671	674	685	674	679
2	626	483	561	713	685	699	683	671	678	674	664	669
3	657	466	572	711	677	696	687	682	685	664	658	661
4	630	465	562	685	672	681	692	684	689	658	653	655
5	587	370	503	674	666	670	692	689	690	655	652	654
6	549	451	510	666	655	659	689	681	685	655	653	654
7	582	387	506	658	648	653	686	680	683	660	655	657
8	584	410	509	650	594	645	689	682	686	662	660	661
9	566	399	498	642	637	640	692	686	690	662	658	660
10	604	365	511	657	638	649	695	690	693	663	657	660
11	594	379	502	679	655	667	695	684	690	666	662	665
12	551	369	473	689	675	680	686	676	682	666	665	665
13	529	342	450	693	675	683	687	676	683	667	665	666
14	507	342	441	713	677	702	699	682	695	667	665	665
15	482	335	420	710	704	707	701	696	699	666	662	664
16	476	375	432	704	606	667	706	699	704	665	661	662
17	477	417	443	618	592	606	711	704	707	673	664	667
18	531	472	502	636	616	628	728	709	723	673	670	672
19	567	515	536	673	634	655	739	725	731	673	668	671
20	583	548	567	693	673	688	740	737	739	668	662	665
21	605	540	580	688	683	685	737	722	727	664	657	662
22	605	573	593	687	683	685	724	719	721	660	655	657
23	606	525	577	687	683	685	721	717	719	657	626	656
24	603	543	584	684	678	681	719	710	714	659	653	656
25	602	520	560	688	680	684	719	714	716	654	653	654
26	536	489	512	690	683	685	718	714	717	658	654	656
27	526	464	499	696	683	691	718	711	714	659	657	658
28	537	443	500	699	695	697	711	700	705	662	659	660
29	500	432	472	696	686	691	706	699	702	663	662	662
30	590	437	523	688	675	682	707	699	704	663	662	663
31	855	583	661	---	---	---	699	685	691	663	659	661
MONTH	855	335	519	713	592	674	740	671	701	685	626	662

CROW RIVER BASIN

05276005 NORTH FORK CROW RIVER ABOVE PAYNESVILLE, MN.--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	660	656	658	678	668	673	269	209	236	566	557	561
2	656	653	654	669	665	667	214	200	207	568	562	566
3	654	652	653	671	662	666	233	199	213	574	567	570
4	654	653	654	670	660	664	245	196	229	579	569	574
5	653	649	651	669	660	661	255	228	247	583	574	580
6	651	649	650	666	654	660	275	234	262	822	581	605
7	651	649	650	660	654	656	295	275	287	743	579	600
8	660	651	654	658	656	657	317	287	304	594	589	592
9	662	655	660	659	655	657	322	303	317	595	590	592
10	666	661	664	658	653	655	341	322	331	742	591	600
11	670	666	668	656	648	653	367	341	354	596	584	591
12	672	669	671	650	645	648	395	367	379	590	586	588
13	673	671	672	651	646	647	423	395	409	593	582	588
14	673	672	673	649	645	647	441	423	433	594	583	588
15	674	672	673	650	645	647	449	441	446	591	583	587
16	676	674	675	660	650	654	450	446	448	595	584	589
17	675	674	675	668	660	664	457	448	452	597	581	589
18	674	670	673	674	668	671	467	457	462	598	581	590
19	671	667	669	675	669	673	480	467	473	593	578	586
20	669	665	667	669	655	662	493	480	487	594	585	589
21	666	659	662	655	626	645	502	493	498	600	578	594
22	662	656	659	629	606	619	510	500	505	604	566	597
23	662	659	661	624	606	614	526	510	518	608	541	602
24	668	662	665	618	609	612	539	525	533	616	532	599
25	675	667	670	610	601	605	537	529	534	611	576	601
26	680	671	675	603	571	591	542	536	538	618	563	605
27	684	676	679	575	483	541	543	540	542	619	544	600
28	685	674	679	488	412	456	550	541	546	619	538	605
29	---	---	---	412	310	368	556	550	552	608	559	595
30	---	---	---	310	278	285	559	554	557	618	600	608
31	---	---	---	305	267	294	---	---	---	623	607	614
MONTH	685	649	665	678	267	607	559	196	410	822	532	592

CROW RIVER BASIN

05276005 NORTH FORK CROW RIVER ABOVE PAYNESVILLE, MN.--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	624	605	618	571	471	545	592	566	582	585	575	581
2	628	470	618	471	404	423	598	557	588	580	536	563
3	644	541	623	452	422	440	595	585	592	591	570	581
4	629	603	620	492	444	469	594	571	584	610	591	606
5	631	608	621	527	487	508	588	577	583	620	610	616
6	630	604	620	552	527	540	588	571	583	---	---	---
7	626	605	619	551	518	540	588	561	579	---	---	---
8	624	597	614	548	515	530	582	563	574	610	575	601
9	617	592	608	565	547	555	582	570	576	606	590	602
10	615	554	606	566	552	559	576	562	569	605	598	602
11	621	603	612	584	560	572	574	563	569	610	599	603
12	616	604	611	599	577	587	585	574	579	611	601	607
13	613	586	603	598	585	591	577	566	572	612	605	610
14	597	574	587	594	541	557	580	569	575	619	604	611
15	595	564	588	566	535	547	586	572	579	622	611	618
16	613	585	597	595	561	577	576	557	566	617	600	608
17	599	586	594	622	588	603	571	562	568	612	605	607
18	608	589	599	623	608	617	576	571	574	634	604	616
19	611	581	599	626	584	615	575	553	559	633	592	624
20	609	576	597	622	593	605	590	560	578	634	619	629
21	608	572	593	594	513	547	586	575	580	640	591	632
22	611	581	603	514	499	506	592	540	585	639	632	636
23	613	589	602	503	487	496	600	590	594	639	632	636
24	616	537	593	511	491	499	599	594	596	644	635	638
25	604	591	595	513	447	473	595	590	592	651	640	645
26	607	586	600	547	488	519	597	592	595	651	635	645
27	605	578	592	568	547	559	597	589	594	649	636	645
28	604	515	572	578	567	572	591	580	589	644	629	640
29	565	371	434	584	573	579	592	574	583	645	633	640
30	543	428	493	583	574	578	593	582	588	646	625	640
31	---	---	---	584	574	581	582	572	576	---	---	---
MONTH	644	371	594	626	404	545	600	540	581	---	---	---

CROW RIVER BASIN

05276005 NORTH FORK CROW RIVER ABOVE PAYNESVILLE, MN.--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT										
03...	1035	6.7	599	616	8.3	8.2	8.0	746	12.5	108
NOV										
01...	1055	57	688	719	7.9	7.9	0.0	733	12.5	90
DEC										
02...	1122	39	678	706	7.4	7.6	0.0	731	10.4	74
JAN										
15...	1145	43	664	692	7.2	7.5	0.0	734	6.6	47
FEB										
11...	1200	20	668	682	7.2	7.7	0.0	737	6.7	48
MAR										
06...	1120	18	658	678	7.2	7.7	0.0	743	8.1	57
APR										
02...	1240	1670	201	213	7.4	7.6	0.5	745	10.7	76
09...	1138	1600	320	343	7.4	7.5	0.5	747	9.7	68
MAY										
05...	1150	127	578	590	8.3	8.1	13.0	727	11.2	112
30...	1200	83	605	600	8.3	8.3	14.5	735	11.8	120
JUN										
17...	1110	20	592	583	8.4	8.3	19.5	738	11.2	126
30...	1145	190	494	474	7.8	7.8	20.0	732	6.4	73
JUL										
08...	1120	266	539	522	7.8	8.0	15.5	735	7.0	72
23...	1218	213	490	487	7.8	8.0	21.0	736	6.6	77
AUG										
05...	1142	78	585	567	8.4	8.4	23.0	740	11.1	133
SEP										
03...	1347	99	583	581	8.2	8.3	19.5	--	7.7	86
17...	1115	66	607	587	8.1	8.1	17.0	731	9.6	101

CROW RIVER BASIN

05276005 NORTH FORK CROW RIVER ABOVE PAYNESVILLE, MN.--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
OCT 03...	310	261	270	318	0	<0.015	0.020	0.30	0.40	0.610
NOV 01...	350	263	259	321	0	0.050	0.020	0.50	0.90	0.800
DEC 02...	370	249	307	304	0	0.150	0.030	0.50	0.90	1.20
JAN 15...	340	308	316	376	0	0.210	0.030	0.70	0.60	1.20
FEB 11...	360	316	317	386	0	0.180	0.020	0.60	0.50	1.50
MAR 06...	330	310	316	378	0	0.180	<0.010	0.60	0.60	1.40
APR 02...	94	80	81	98	0	0.650	0.050	1.4	2.0	1.20
09...	160	130	137	159	0	0.280	0.050	1.1	1.4	1.90
MAY 05...	320	257	266	314	0	<0.015	<0.010	0.46	0.61	0.496
30...	320	269	279	328	0	<0.015	0.012	0.45	0.60	0.620
JUN 17...	300	243	243	287	5	<0.015	0.024	0.42	0.55	0.612
30...	240	178	184	217	0	0.198	0.112	1.1	1.1	3.56
JUL 08...	260	231	243	282	0	0.032	0.020	0.82	0.97	1.10
23...	230	207	225	253	0	<0.015	<0.010	1.0	1.3	0.500
AUG 05...	300	246	282	295	2	0.015	0.017	0.66	0.92	0.641
SEP 03...	280	263	275	321	0	<0.015	0.014	0.71	0.83	0.776
17...	330	286	278	349	0	<0.015	0.012	0.53	0.71	0.618

CROW RIVER BASIN

05276005 NORTH FORK CROW RIVER ABOVE PAYNESVILLE, MN.--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)
OCT 03...	<0.010	<0.010	0.010	4.6	0.40	78	29	7.2	0.2	3.3
NOV 01...	0.100	0.050	0.050	6.6	1.4	92	30	7.1	0.2	4.4
DEC 02...	0.030	<0.010	0.010	5.2	0.70	95	33	7.0	0.2	3.1
JAN 15...	0.040	0.020	0.020	5.0	--	85	30	6.3	0.1	2.9
FEB 11...	<0.010	0.020	0.010	4.7	--	90	32	6.8	0.2	2.8
MAR 06...	<0.010	<0.010	0.020	4.8	0.20	85	29	6.5	0.2	2.8
APR 02...	0.510	0.400	0.360	7.2	1.5	25	7.7	1.9	0.1	4.0
09...	0.220	0.170	0.160	8.7	1.1	42	13	2.7	0.1	4.5
MAY 05...	0.095	<0.010	<0.010	6.4	0.60	81	28	5.7	0.1	2.9
30...	<0.010	<0.010	<0.010	6.2	0.60	83	28	6.0	0.1	2.3
JUN 17...	<0.010	<0.010	<0.010	5.3	0.10	72	29	7.1	0.2	2.7
30...	0.243	0.202	0.177	9.7	2.9	63	21	5.4	0.2	4.0
JUL 08...	0.150	0.104	0.106	9.4	1.0	67	23	5.0	0.1	2.7
23...	0.244	0.213	0.166	14	1.3	60	20	4.0	0.1	3.7
AUG 05...	0.089	0.061	0.058	9.8	0.50	77	27	5.2	0.1	2.1
SEP 03...	0.105	0.067	0.074	8.8	0.60	71	26	5.6	0.1	3.3
17...	0.030	0.032	0.029	6.9	0.80	86	28	6.2	0.1	2.5

CROW RIVER BASIN

05276005 NORTH FORK CROW RIVER ABOVE PAYNESVILLE, MN.--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
03...	17	51	0.20	15	8.0	60	378	360	37	77
NOV										
01...	18	110	0.20	16	25	89	466	439	86	58
DEC										
02...	18	56	0.20	19	22	120	429	386	49	36
JAN										
15...	14	44	0.20	20	10	140	426	393	48	36
FEB										
11...	14	40	0.20	22	13	150	417	405	51	34
MAR										
06...	15	39	0.20	20	9.0	130	412	390	76	27
APR										
02...	4.7	10	0.10	6.8	43	57	130	116	53	82
09...	7.9	20	0.16	11	38	5.6	208	189	23	63
MAY										
05...	13	40	<0.10	7.0	56	49	356	335	38	48
30...	14	36	0.14	8.7	48	45	366	341	12	97
JUN										
17...	15	45	0.14	9.2	4.3	22	372	330	68	55
30...	13	40	0.20	17	23	51	315	287	53	98
JUL										
08...	12	28	0.17	21	32	33	351	303	39	79
23...	10	21	0.23	25	36	33	338	271	20	94
AUG										
05...	12	22	0.24	23	12	35	383	319	125	31
SEP										
03...	14	24	0.22	20	13	27	369	325	E54	E62
17...	14	24	0.17	22	13	38	374	357	49	42

CROW RIVER BASIN

05280000 CROW RIVER AT ROCKFORD, MN

LOCATION.--Lat 45°05'12", long 93°44'02", in sec. 29, T.119 N., R.24 W., Hennepin County, Hydrologic Unit 07010204, on right bank at Rockford, 150 ft downstream from bridge on State Highway 55 and 1 mi downstream from confluence of North and South Forks.

DRAINAGE AREA.--2,520 mi², approximately.

PERIOD OF RECORD.--April to July 1906 (published as "near Dayton"), June 1909 to September 1917, April to November 1929, March 1930 to September 1931, April to November 1932, March to November 1933, March 1934 to current year. Monthly discharge only for some periods, published in V'SP 1308.

REVISED RECORDS.--WSP 1115: 1932. WSP 1508: 1933. WDR MN-77-2: 1972 (M)(m).

GAGE.--Water-stage recorder. Datum of gage is 893.08 ft above mean sea level. Apr. 13 to July 21, 1906, nonrecording gage at Berning Mill 14 mi downstream at different datum. June 4, 1909 to Sept. 30, 1917, nonrecording gage at site 600 ft downstream at different datum. Apr. 23, 1929 to Aug. 21, 1934, nonrecording gage at site 600 ft downstream at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	102	223	524	e300	e300	e292	5120	3570	917	1200	6180	2640
2	102	215	e526	e300	e310	e289	5840	3400	885	1640	5890	2410
3	101	240	e510	e298	e290	e284	6570	3280	856	2090	5560	2170
4	97	241	e495	e296	e290	e279	7360	3130	830	2600	5160	1960
5	95	252	480	e295	e300	e278	8480	2990	805	3360	4710	1810
6	92	255	464	e294	e300	e277	9820	2830	774	4200	4370	1680
7	91	239	486	e293	e300	e277	11000	2690	755	4850	4010	1550
8	93	227	454	e292	e290	e278	11700	2590	728	5310	3690	1450
9	92	226	446	e290	e290	e285	11800	2470	696	5530	3390	1410
10	92	226	435	e290	e285	e295	11400	2350	632	5590	3130	1340
11	93	218	425	e285	e285	e300	10700	2240	602	5470	2880	1290
12	91	181	417	e285	e280	e300	9880	2120	569	5260	2660	1250
13	91	207	410	e285	e280	e300	9090	2000	543	4990	2470	1190
14	91	194	e395	e285	e270	e300	8410	1900	521	4760	2300	1120
15	95	164	e380	e285	e270	e298	7840	1820	502	4520	2140	1070
16	102	231	e370	e280	e275	e295	7380	1730	484	4260	1980	1060
17	124	416	e360	e280	e290	e293	7010	1650	457	3960	1890	1230
18	146	615	e350	e280	e300	e293	6680	1590	442	3690	1800	1350
19	161	755	e350	e280	e300	e298	6410	1530	430	3600	1790	1340
20	173	693	e340	e280	322	e300	6150	1470	418	3530	2140	1270
21	182	573	e340	e285	320	e325	5890	1440	408	3490	2470	1210
22	184	e600	e330	e285	314	e350	5610	1390	392	3780	2810	1130
23	182	e560	e320	e285	310	e430	5350	1330	378	4050	3120	1070
24	174	e540	e310	e285	308	e600	5090	1270	365	4470	3330	1030
25	161	e510	e300	e280	e305	e720	4840	1220	359	5230	3450	983
26	163	e490	e300	e280	e302	e940	4590	1170	348	5740	3580	943
27	172	e480	e300	e275	e298	e1250	4360	1110	363	e6100	3690	895
28	172	e490	e290	e275	e294	e1800	4140	1060	391	e6250	3710	857
29	179	e500	e290	e280	---	2480	3930	1010	449	e6400	3560	824
30	197	511	e290	e280	---	3130	3750	985	767	e6550	3260	798
31	201	---	e300	e290	---	4230	---	956	---	6350	2920	---
TOTAL	4091	11272	11987	8873	8278	22066	216190	60291	17066	138820	104040	40330
MEAN	132	376	387	286	296	712	7206	1945	569	4478	3356	1344
MAX	201	755	526	300	322	4230	11800	3570	917	6550	6180	2640
MIN	91	164	290	275	270	277	3750	956	348	1200	1790	798
AC-FT	8110	22360	23780	17600	16420	43770	428800	119600	33850	275300	206400	79990
CFSM	.05	.15	.15	.11	.12	.28	2.86	.77	.23	1.78	1.33	.53
IN.	.06	.17	.18	.13	.12	.33	3.19	.89	.25	2.05	1.54	.60

e Estimated

CROW RIVER BASIN

05280000 CROW RIVER AT ROCKFORD, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1906 - 1997, BY WATER YEAR (WY)

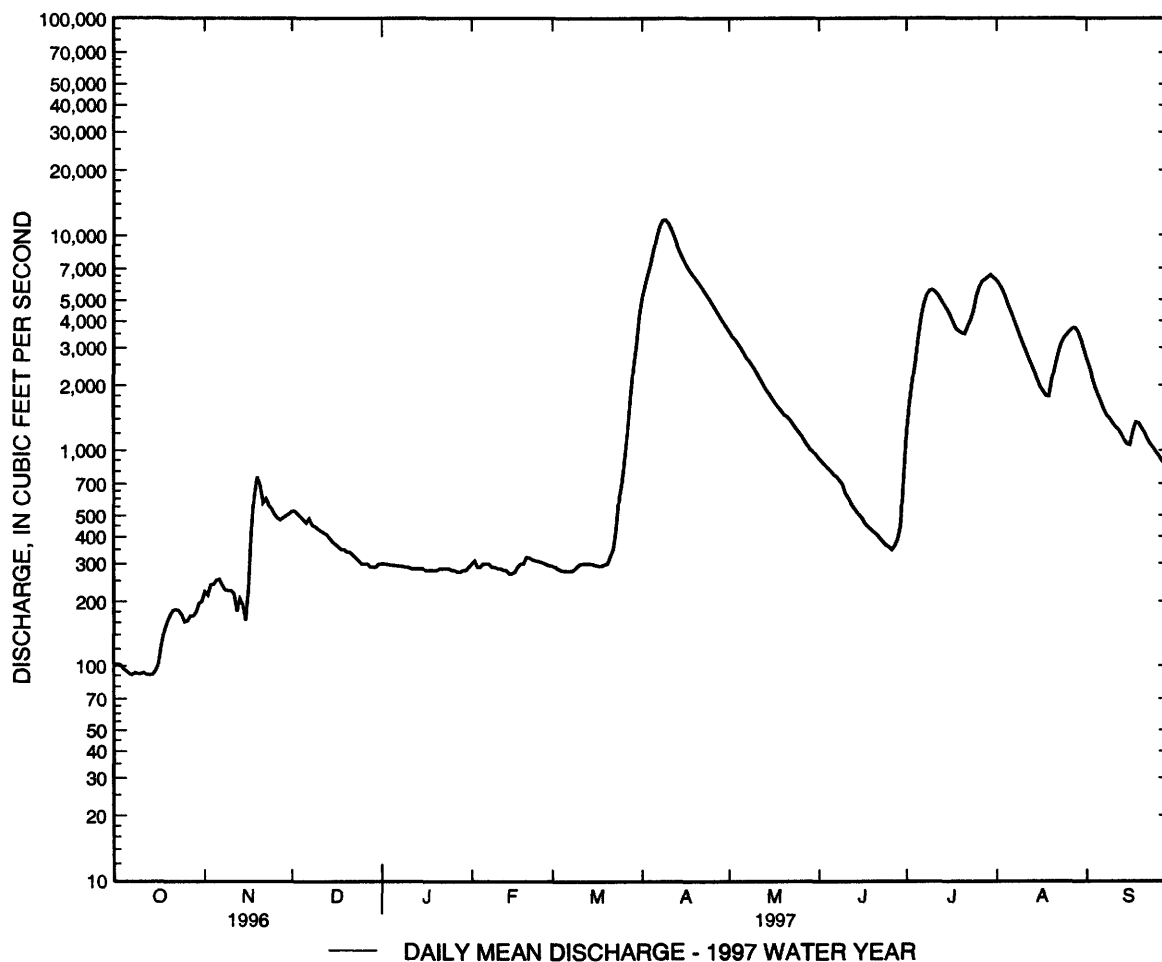
MEAN	449	425	295	173	165	859	2192	1446	1256	1023	561	492
MAX	3809	1909	1477	928	1115	4085	9026	5992	6166	6759	3356	4941
(WY)	1986	1972	1983	1992	1966	1983	1965	1986	1906	1993	1997	1991
MIN	16.6	28.3	17.3	12.4	12.5	25.1	57.1	26.7	14.8	5.76	5.87	13.0
(WY)	1934	1937	1938	1938	1959	1934	1934	1934	1934	1934	1934	1933

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1906 - 1997	
ANNUAL TOTAL	370264		643304			
ANNUAL MEAN	1012		1762		810 ^a	
HIGHEST ANNUAL MEAN					2754	
LOWEST ANNUAL MEAN					64.5	
HIGHEST DAILY MEAN	4200	Apr 2	11800	Apr 9	22100	Apr 16 19 ^c
LOWEST DAILY MEAN	86	Sep 19	91	Oct 7	3.8	Aug 4 1934
ANNUAL SEVEN-DAY MINIMUM	91	Sep 17	92	Oct 7	4.0	Jul 31 1934
INSTANTANEOUS PEAK FLOW			11800	Apr 8	22400	Apr 16 19 ^c
INSTANTANEOUS PEAK STAGE			14.42	Apr 8	19.27 ^b	Apr 16 19 ^c
INSTANTANEOUS LOW FLOW			91	Oct 6	1.8 ^c	Nov 15 1936
ANNUAL RUNOFF (AC-FT)	734400		1276000		586700	
ANNUAL RUNOFF (CFSM)	.40		.70		.32	
ANNUAL RUNOFF (INCHES)	5.47		9.50		4.37	
10 PERCENT EXCEEDS	3240		5240		2240	
50 PERCENT EXCEEDS	347		526		265	
90 PERCENT EXCEEDS	112		217		38	

a Median of annual mean discharges is 606 ft³/s.

b From floodmark.

c Caused by ice jam upstream.



CROW RIVER BASIN

05280000 CROW RIVER AT ROCKFORD, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00300)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR- BONATE WATER DIS IT FIELD MG/L AS CC 3 (00452)	
MAR 28...	1015 1800		0.0	725	520	7.4	10.4	75	178	217	0

DATE	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAR 28...	0.620	0.060	1.3	1.8	3.60	0.510	0.270	0.240	100	85

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RUM RIVER BASIN

05284000 MILLE LACS LAKE AT COVE BAY NEAR ONAMIA, MN

LOCATION.--Lat 46°06'36", long 93°37'08", in NE¹/₄NE¹/₄ sec. 21, T.42 N., R.26 W., Mille Lacs County, Hydrologic Unit 07010207, in Minnesota Department of Natural Resources boathouse at Cove Bay boatlanding, 3.6 mi northeast of Onamia.

PERIOD OF RECORD.--June 1931 to current year. Monthend records for the period October 1939 to September 1953 published in WSP 1278 (fragmentary 1940-41). Published as "at Wealthwood" prior to October 1939, and as "at Garrison" October 1939 to September 1987 (gage heights collected at Wealthwood October 1939 to September 1941, but converted to gage datum at Garrison for publication).

GAGE.--Water-stage recorder. Datum of gage is 1,240.40 ft above mean sea level (levels by Minnesota Department of Natural Resources). Gage readings have been reduced to elevations above sea level. Prior to Oct. 1, 1941, nonrecording gage at Wealthwood, 17 mi north of present site, at various datums; gage readings have been reduced to elevations, adjustment of 1912. Oct. 1, 1941 to Sept. 30, 1958, water-stage recorder at Garrison, 16 mi northwest of present site at datum 1,240.50 ft, adjustment of 1912. To convert these readings to National Geodetic Vertical Datum of 1929, subtract 0.10 ft. Oct. 1, 1958 to Sept. 30, 1987, water stage recorder at Garrison at present datum.

REMARKS.--Water level affected by fixed-crest spillway constructed in 1953 at outlet of Ogechie Lake, 2.7 mi downstream from outlet of Mille Lacs Lake, with crest at elevation 1,250.50 ft. Water level subject to fluctuation caused by seiches.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 13.87 ft, Aug. 14, 1972, affected by seiche action; maximum daily, 13.43 ft, Aug. 22, 1972; minimum observed, 15.74 ft, Oct. 16-19, 1936.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 12.87 ft, May 21, affected by seiche action; maximum daily, 12.26 ft, June 3; minimum recorded, 11.11 ft, Sept. 26; minimum daily recorded, 11.27 ft, Sept. 26.

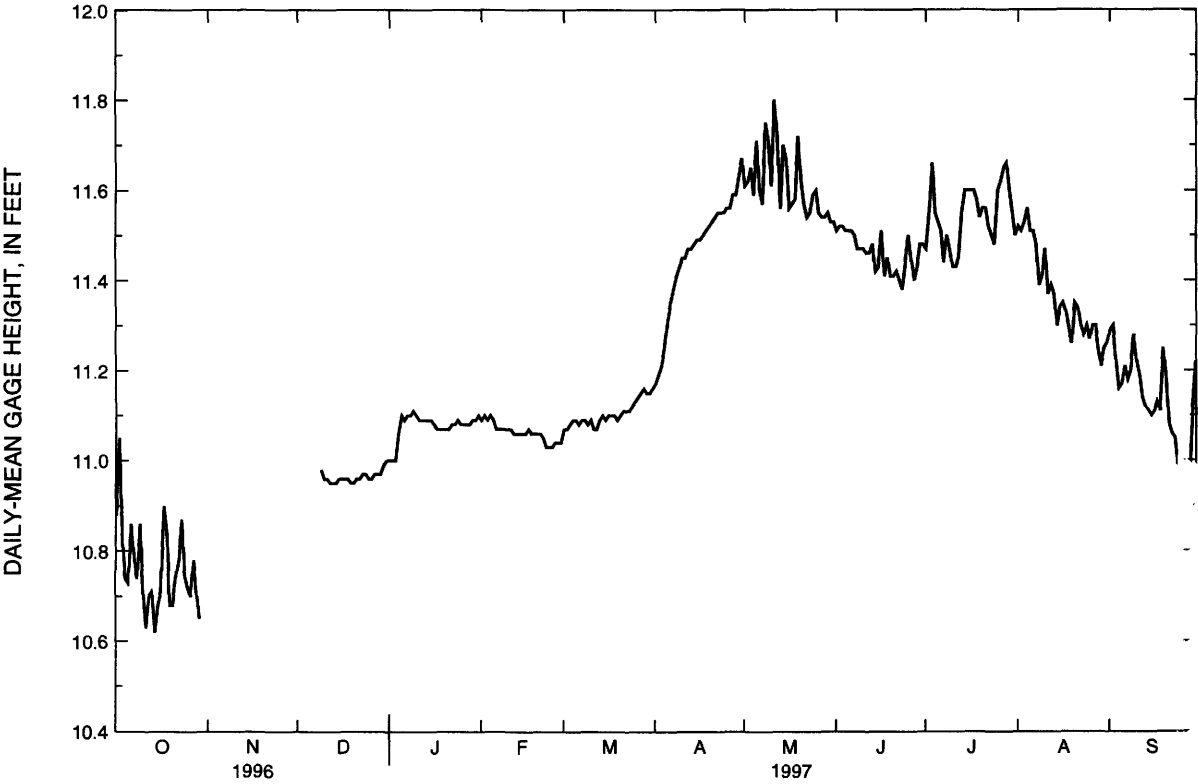
GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10.88	---	---	11.00	11.09	11.07	11.17	11.61	11.51	11.47	11.52	11.29
2	11.05	---	---	11.00	11.10	11.07	11.19	11.62	11.52	11.55	11.51	11.30
3	10.82	---	---	11.00	11.09	11.08	11.21	11.65	11.52	11.66	11.53	11.22
4	10.74	---	---	11.06	11.10	11.09	11.25	11.59	11.51	11.55	11.56	11.16
5	10.73	---	---	11.10	11.09	11.09	11.31	11.71	11.51	11.53	11.51	11.17
6	10.86	---	---	11.09	11.07	11.08	11.35	11.60	11.51	11.51	11.51	11.21
7	10.78	---	---	11.10	11.07	11.09	11.38	11.57	11.50	11.44	11.48	11.18
8	10.74	---	---	11.10	11.07	11.09	11.41	11.75	11.47	11.50	11.39	11.20
9	10.86	---	10.98	11.11	11.07	11.08	11.43	11.71	11.47	11.47	11.41	11.28
10	10.72	---	10.96	11.10	11.07	11.09	11.45	11.61	11.47	11.43	11.47	11.22
11	10.63	---	10.96	11.09	11.07	11.07	11.45	11.80	11.46	11.43	11.37	11.19
12	10.70	---	10.95	11.09	11.06	11.07	11.47	11.72	11.46	11.45	11.39	11.14
13	10.71	---	10.95	11.09	11.06	11.09	11.47	11.56	11.48	11.55	11.37	11.12
14	10.62	---	10.95	11.09	11.06	11.10	11.48	11.70	11.42	11.60	11.30	11.11
15	10.68	---	10.96	11.09	11.06	11.09	11.49	11.67	11.43	11.60	11.34	11.10
16	10.71	---	10.96	11.08	11.06	11.10	11.49	11.56	11.51	11.60	11.35	11.11
17	10.90	---	10.96	11.07	11.07	11.10	11.50	11.57	11.41	11.60	11.33	11.13
18	10.84	---	10.96	11.07	11.06	11.10	11.51	11.58	11.45	11.58	11.29	11.11
19	10.68	---	10.95	11.07	11.06	11.09	11.52	11.72	11.41	11.54	11.26	11.25
20	10.68	---	10.95	11.07	11.06	11.10	11.53	11.62	11.41	11.56	11.35	11.19
21	10.74	---	10.96	11.07	11.06	11.11	11.54	11.57	11.42	11.56	11.34	11.08
22	10.78	---	10.96	11.08	11.05	11.11	11.55	11.54	11.40	11.52	11.30	11.06
23	10.87	---	10.97	11.08	11.03	11.11	11.55	11.55	11.38	11.50	11.28	11.05
24	10.75	---	10.97	11.09	11.03	11.12	11.55	11.59	11.44	11.48	11.30	10.99
25	10.72	---	10.96	11.08	11.03	11.13	11.56	11.60	11.50	11.60	11.27	11.02
26	10.70	---	10.96	11.08	11.04	11.14	11.56	11.55	11.45	11.62	11.30	10.96
27	10.78	---	10.97	11.08	11.04	11.15	11.59	11.54	11.40	11.65	11.30	10.95
28	10.71	---	10.97	11.08	11.04	11.16	11.59	11.54	11.43	11.66	11.25	10.94
29	10.65	---	10.97	11.09	---	11.15	11.63	11.55	11.48	11.60	11.21	11.12
30	---	---	10.99	11.09	---	11.15	11.67	11.53	11.48	11.55	11.25	11.22
31	---	---	11.00	11.10	---	11.16	---	11.53	---	11.50	11.26	---
MEAN	---	---	---	11.08	11.06	11.10	11.46	11.61	11.46	11.54	11.36	11.14
MAX	11.05	---	---	11.11	11.10	11.16	11.67	11.80	11.52	11.66	11.56	11.30
MIN	---	---	---	11.00	11.03	11.07	11.17	11.53	11.38	11.43	11.21	10.94

RUM RIVER BASIN

05284000 MILLE LACS LAKE AT COVE BAY NEAR ONAMIA, MN--Continued



RUM RIVER BASIN

05286000 RUM RIVER NEAR ST. FRANCIS, MN

LOCATION.--Lat 45°19'40", long 93°22'20", in SE $\frac{1}{4}$ sec. 19, T.33 N., R.24 W., Anoka County, Hydrologic Unit 07010207, on left bank at upstream side of highway bridge, 4 mi south of St. Francis and 15.8 mi upstream from mouth.

DRAINAGE AREA.--1,360 mi², approximately.

PERIOD OF RECORD.--May to November 1929, March 1930 to September 1931, April to November 1932, March 1933 to current year.

REVISED RECORDS.--WSP 1308: 1930(M), 1932(M).

GAGE.--Water-stage recorder. Datum of gage is 860.74 ft above mean sea level (levels by Anoka County Highway Department). Prior to Nov. 9, 1933, nonrecording gage at site 50 ft downstream at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Occasional regulation by Ogechie (also controls Mille Lacs Lake) and Onamia Lakes.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	254	397	e555	e270	e255	e400	1730	871	562	510	775	e445
2	246	394	e540	e270	e260	e400	2220	840	546	799	719	430
3	233	376	e530	e270	e270	e400	2630	820	523	821	693	416
4	225	354	e510	e270	e280	e400	2880	789	502	825	e690	409
5	223	360	e500	e270	e290	e400	3420	749	488	771	e710	399
6	225	378	e485	e270	e300	e400	4800	716	466	718	e730	385
7	227	385	e475	e270	e315	e400	6440	697	446	688	e740	373
8	219	376	e460	e270	e330	e415	7320	715	422	730	e730	364
9	216	361	e455	e270	e345	e430	7770	724	401	723	e690	370
10	211	356	e450	e270	e360	e435	7910	714	386	704	e620	372
11	211	347	e440	e270	e370	e450	7610	720	373	722	e560	363
12	212	e295	e430	e265	e375	e450	7020	733	366	692	e510	346
13	211	e285	e415	e265	e380	e450	6290	726	356	857	e490	338
14	215	e290	e400	e265	e380	e450	5430	709	343	1030	e485	332
15	210	e230	e380	e260	e385	e450	4560	695	337	972	e480	328
16	212	e300	e360	e260	e390	e450	3870	677	336	893	e485	376
17	248	e450	e345	e260	e390	e450	3280	664	330	836	e490	419
18	280	e700	e330	e255	e395	e450	2810	663	334	761	e520	418
19	290	e900	e315	e255	e395	e455	2390	661	334	699	e600	407
20	294	e960	e305	e250	e400	e460	2080	652	334	673	e670	386
21	311	e940	e290	e250	e400	e470	1850	640	335	674	e690	361
22	306	e900	e280	e250	e400	e480	1670	634	331	696	e700	352
23	322	e830	e275	e250	e400	e490	1500	634	315	744	e700	355
24	340	e770	e270	e250	e400	e515	1360	640	284	790	e670	348
25	345	e730	e270	e250	e400	e540	1250	626	270	857	e640	341
26	343	e680	e270	e250	e400	e570	1160	604	265	880	e580	332
27	343	e650	e270	e250	e400	e610	1090	596	263	870	e540	326
28	343	e620	e270	e250	e400	689	1030	591	320	880	e520	327
29	356	e600	e270	e250	---	806	972	591	417	892	e500	314
30	384	e570	e270	e250	---	1000	918	584	461	872	e485	306
31	404	---	e270	e250	---	1250	---	578	---	830	e465	---
TOTAL	8459	15784	11685	8055	10065	16015	105260	21253	11446	24409	18877	11038
MEAN	273	526	377	260	359	517	3509	686	382	787	609	368
MAX	404	960	555	270	400	1250	7910	871	562	1030	775	445
MIN	210	230	270	250	255	400	918	578	263	510	465	306
AC-FT	16780	31310	23180	15980	19960	31770	208800	42160	22700	48420	37440	21890
CFSM	.20	.39	.28	.19	.26	.38	2.58	.50	.28	.58	.45	.27

e Estimated

RUM RIVER BASIN

05286000 RUM RIVER NEAR ST. FRANCIS, MN--Continued

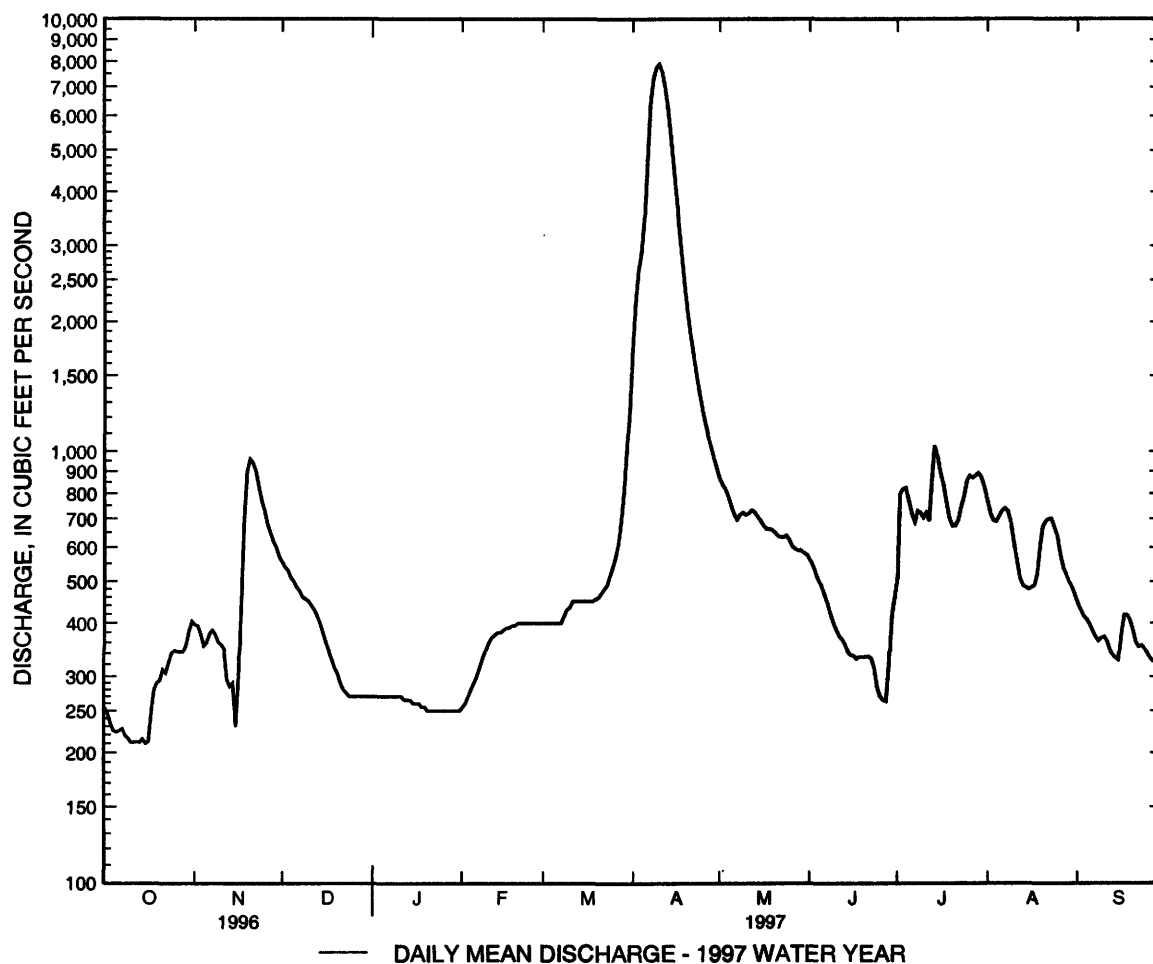
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	465	450	328	246	248	626	1558	1108	873	638	413	433
MAX	2300	1715	1051	660	813	2699	4269	3899	3400	2532	2251	2362
(WY)	1969	1972	1983	1987	1966	1966	1969	1986	1984	1954	1972	1986
MIN	65.4	71.8	55.8	51.5	59.2	75.8	154	73.6	43.7	34.5	37.3	47.1
(WY)	1934	1934	1934	1934	1934	1934	1934	1934	1934	1934	1934	1933

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1929 - 1997
ANNUAL TOTAL	278596	262346	
ANNUAL MEAN	761	719	634
HIGHEST ANNUAL MEAN			1512
LOWEST ANNUAL MEAN			66.1
HIGHEST DAILY MEAN	4400	Apr 24	7910
LOWEST DAILY MEAN	210	Oct 15	210
ANNUAL SEVEN-DAY MINIMUM	212	Oct 10	212
INSTANTANEOUS PEAK FLOW		7960	Apr 10
INSTANTANEOUS PEAK STAGE		10.11	Apr 10
INSTANTANEOUS LOW FLOW		162 ^b	Nov 15
ANNUAL RUNOFF (AC-FT)	552600	520400	459600
ANNUAL RUNOFF (CFSM)	.56	.53	.47
10 PERCENT EXCEEDS	1680	907	1360
50 PERCENT EXCEEDS	467	422	365
90 PERCENT EXCEEDS	251	260	110

a Also occurred Apr. 13, 1969.

b Result of freezeup.



RUM RIVER BASIN

05286000 RUM RIVER NEAR ST. FRANCIS, MN--Continued

(National Water-Quality Assessment Station)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
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APR 02...	0922	2160	199	7.4	2.0	746	11.0	81	80	98
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DATE	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
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APR 02...	0	0.330	0.020	1.0	1.2	0.850	0.190	0.050	0.040	72	47
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ELM CREEK BASIN

05287890 ELM CREEK NEAR CHAMPLIN, MN

LOCATION.--Lat 45°09'48", long 93°26'11", in NE¹/₄NW¹/₄ sec. 35, T.120 N., R.22 W., Hennepin County, Hydrologic Unit 07010206, on left bank, 33 ft downstream from bridge on Elm Creek Road, 2.5 mi southwest of Champlin.

DRAINAGE AREA.--84.9 mi².

PERIOD OF RECORD.--October 1978 to current year.

GAGE.--Water-stage recorder. Datum of gage is 850.71 ft above mean sea level. Prior to March 15, 1979, nonrecording gage at present site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.5	24	e23	e8.7	e7.8	e8.0	420	28	e9.0	7.0	92	40
2	9.1	23	e21	e8.6	e7.8	e8.8	421	27	e8.6	9.9	84	39
3	14	21	e19	e8.5	e7.8	9.7	403	33	8.4	12	78	36
4	15	20	e18	e8.4	e7.8	12	382	32	8.4	13	70	33
5	16	20	e17	e8.5	e7.8	e12	367	31	8.4	11	63	31
6	17	19	e16	e8.7	e7.9	12	359	30	8.1	10	58	28
7	18	18	e15	e8.7	e7.9	e12	340	28	7.5	11	52	25
8	19	17	e15	e8.7	e7.8	e12	312	28	7.1	13	47	24
9	19	15	e14	e8.6	e7.6	12	280	27	6.6	15	42	26
10	24	14	e13	e8.4	7.4	12	255	25	6.4	14	39	25
11	34	13	e13	e8.2	e7.2	e12	229	24	6.3	14	35	23
12	39	14	e12	e7.9	e7.0	e13	201	22	6.1	15	31	21
13	37	12	e12	e7.5	e6.8	e14	173	21	e5.9	15	28	19
14	31	11	e12	e7.3	e6.5	e14	147	21	e5.7	16	27	18
15	25	12	e12	e7.1	e6.4	e13	128	20	e5.6	15	26	17
16	20	21	e12	e6.8	e6.4	e12	115	20	5.6	14	24	18
17	24	53	e11	e6.7	6.4	12	102	19	5.6	13	22	21
18	25	97	e10	e6.5	6.9	12	92	21	5.7	12	20	21
19	30	107	e9.8	e6.5	7.5	13	83	22	5.6	13	28	20
20	28	86	e9.7	e6.8	7.1	13	74	21	5.5	14	59	19
21	25	79	e9.6	e7.2	7.5	15	67	19	5.4	16	69	18
22	23	71	e9.5	e7.4	e8.0	24	60	18	5.1	33	67	16
23	25	e60	e9.4	e7.6	e8.0	39	54	17	5.0	65	65	15
24	25	e54	e9.3	e7.5	e7.5	e50	49	16	5.2	76	63	15
25	23	e50	e9.2	e7.4	7.4	e57	44	15	5.2	91	62	15
26	22	e42	e9.2	e7.1	7.5	e62	40	14	4.7	121	60	14
27	20	e36	e9.0	e6.8	e7.6	74	37	12	4.4	132	57	13
28	20	e31	e9.0	e6.7	e7.6	e180	35	11	4.7	127	53	12
29	21	e27	e9.0	e6.6	---	e250	32	e10	6.2	119	50	11
30	27	e25	e9.0	e6.9	---	369	30	e9.9	6.3	110	46	11
31	26	---	e8.8	e7.5	---	391	---	e9.5	---	101	43	---
TOTAL	704.6	1092	385.5	235.8	206.9	1749.5	5331	651.4	188.3	1247.9	1560	644
MEAN	22.7	36.4	12.4	7.61	7.39	56.4	178	21.0	6.28	40.3	50.3	21.5
MAX	39	107	23	8.7	8.0	391	421	33	9.0	132	92	40
MIN	3.5	11	8.8	6.5	6.4	8.0	30	9.5	4.4	7.0	20	11
AC-FT	1400	2170	765	468	410	3470	10570	1290	373	2480	3090	1280
CFSM	.27	.43	.15	.09	.09	.66	2.09	.25	.07	.47	.59	.25
IN.	.31	.48	.17	.10	.09	.77	2.34	.29	.08	.55	.68	.28

e Estimated

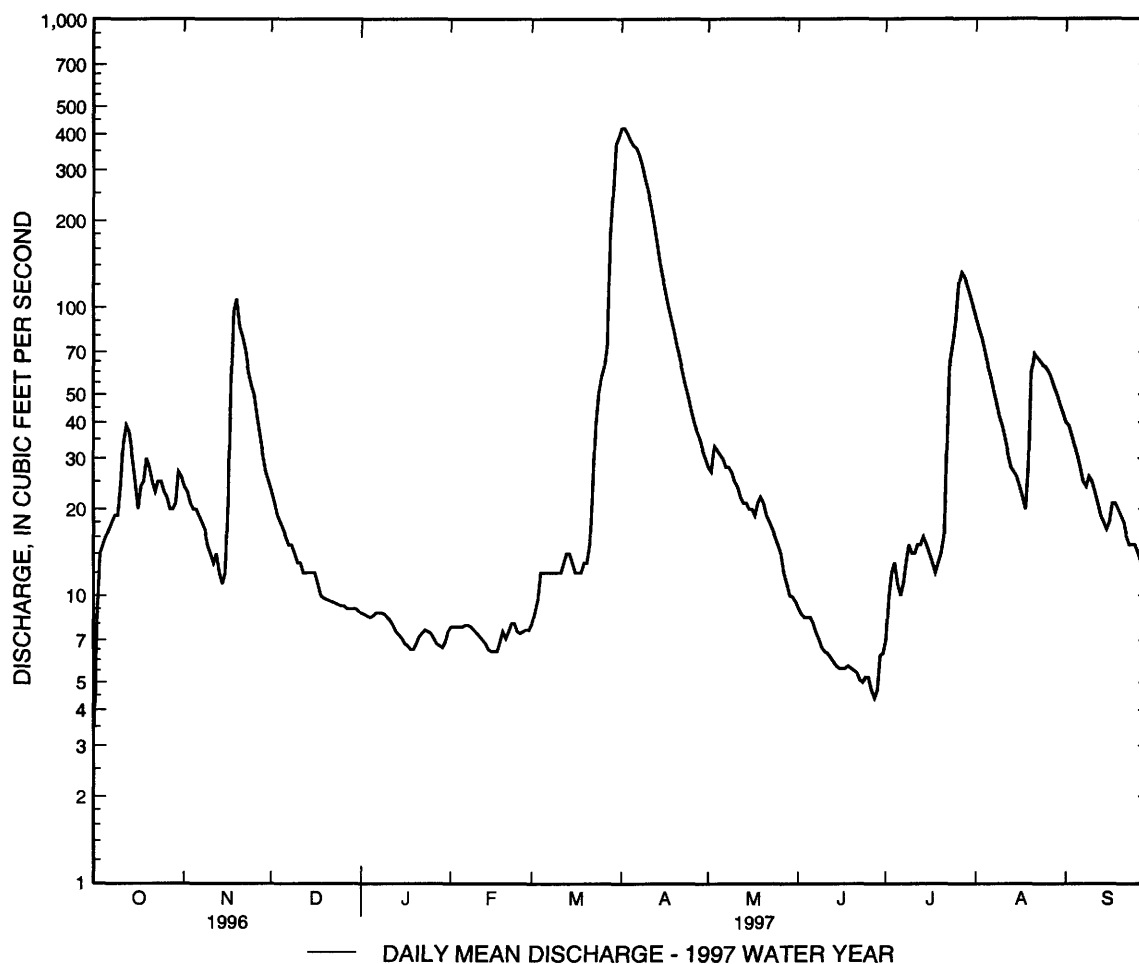
ELM CREEK BASIN

05287890 ELM CREEK NEAR CHAMPLIN, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1979 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	30.8	23.6	12.4	6.02	10.6	73.3	95.4	58.9	40.4	33.5	32.0	29.1
MAX	229	67.4	41.3	22.0	99.1	182	221	146	140	157	143	170
(WY)	1986	1994	1992	1992	1984	1992	1986	1991	1991	1993	1993	1991
MIN	1.13	1.03	.92	.74	.91	5.51	5.31	4.95	1.34	.76	1.44	1.08
(WY)	1990	1990	1990	1991	1990	1981	1987	1987	1988	1988	1989	1988

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1979 - 1997
ANNUAL TOTAL	15139.4	13996.9	
ANNUAL MEAN	41.4	38.3	37.3
HIGHEST ANNUAL MEAN			75.1
LOWEST ANNUAL MEAN			4.54
HIGHEST DAILY MEAN	369	Mar 19	545
LOWEST DAILY MEAN	1.7	Sep 7	.31
ANNUAL SEVEN-DAY MINIMUM	1.7	Sep 7	.35
INSTANTANEOUS PEAK FLOW		432	597
INSTANTANEOUS PEAK STAGE		9.33	9.93
INSTANTANEOUS LOW FLOW		3.2	.29
ANNUAL RUNOFF (AC-FT)	30030	27760	26990
ANNUAL RUNOFF (CFSM)	.49	.45	.44
ANNUAL RUNOFF (INCHES)	6.63	6.13	5.96
10 PERCENT EXCEEDS	118	78	107
50 PERCENT EXCEEDS	12	16	13
90 PERCENT EXCEEDS	2.3	6.9	1.8



ELM CREEK BASIN

05287890 ELM CREEK NEAR CHAMPLIN, MN--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.-- February 1988 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

(Samples Collected Manually)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
OCT 03...	1350	14	502	7.6	9.5	754	9.3	82	0.020
JAN 08...	1510	8.7	688	7.2	0.0	742	7.6	53	0.590
MAR 03...	1425	9.6	873	7.4	1.5	740	10.7	79	0.630
28...	1330	173	389	7.1	1.5	725	--	--	0.610
APR 01...	1025	418	355	7.2	3.0	741	10.5	81	0.400
JUL 25...	1125	91	536	7.5	22.0	738	4.0	47	0.074
SEP 05...	1230	31	493	7.4	17.5	738	6.2	67	0.175

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDEDED (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDEDED (MG/L) (00535)	SEDI- MENT, SUS- PENDEDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 03...	<0.010	1.3	0.060	0.260	0.170	9	2	--	--
JAN 08...	0.020	1.4	0.320	0.080	0.020	2	2	--	--
MAR 03...	0.020	1.7	0.320	0.070	0.010	<1	<1	--	--
28...	0.070	2.0	1.70	0.510	0.220	66	14	100	83
APR 01...	0.060	1.1	2.30	0.290	0.190	13	1	--	--
JUL 25...	0.029	1.3	0.148	0.345	0.308	13	7	--	--
SEP 05...	0.036	1.5	0.129	0.326	0.234	7	5	--	--

ELM CREEK BASIN

05287890 ELM CREEK NEAR CHAMPLIN, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

(Samples Collected By Automatic Sampler)

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
OCT 03-16	1500	523	8.1	190	0.330	0.250	48	17	24
MAR 25-28	2330	500	7.5	180	0.450	0.170	49	14	22
MAR 28- APR 06	2200	363	7.6	140	0.300	0.179	38	10	12
APR 08-15	1400	413	7.8	160	0.170	0.090	44	13	15
JUL 24- AUG 01	1500	502	7.9	200	0.443	0.350	51	16	21

DATE	SODIUM AD- SORP- TION RATIO (00931)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)
OCT 03-16	0.8	9.6	18	63	<0.50	<1.0	<5.0	<3.0	10
MAR 25-28	0.7	13	62	55	<0.50	<1.0	<5.0	<3.0	<10
MAR 28- APR 06	0.5	12	20	41	<0.50	<1.0	<5.0	<3.0	<10
APR 08-15	0.5	14	14	44	<0.50	<1.0	<5.0	<3.0	<10
JUL 24- AUG 01	0.7	22	15	59	<0.50	1.3	<5.0	<3.0	<10

DATE	MANGA- IRON, DIS- SOLVED (UG/L AS FE) (01046)	VANA- LEAD, DIS- SOLVED (UG/L AS PB) (01049)	NESE, DIS- SOLVED (UG/L AS MN) (01056)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)
OCT 03-16	25	<10	6.0	<10	<1.0	<6	<3.0	6
MAR 25-28	53	<10	280	<10	<1.0	<6	6.0	<4
MAR 28- APR 06	45	<10	25	<10	<1.0	<6	<3.0	5
APR 08-15	40	<10	7.8	<10	<1.0	<6	<3.0	4
JUL 24- AUG 01	37	<10	124	<10	<1.0	<6	5.8	7

ELM CREEK BASIN

05287890 ELM CREEK NEAR CHAMPLIN, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

(National Water-Quality Assessment Station Samples)

(Samples Collected Manually)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE-CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
SEP 24...	1152	28	521	506	7.7	8.2	12.0	744	7.5	72
DATE		HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)
SEP 24...	240	210		<0.015	<0.010	1.2	1.3	0.335	0.190	0.115
DATE		PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
SEP 24...	<0.010	14		0.70	63	19	16	0.5	5.1	35
DATE		SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
SEP 24...	10	0.17		18	58	261	326	295	6	100

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UPPER MISSISSIPPI RIVER BASIN

05288500 MISSISSIPPI RIVER NEAR ANOKA, MN

LOCATION.--Lat 45°07'36", long 93°17'48", in SW¹/₄ sec. 12, T.119 N., R.21 W., Hennepin County, Hydrologic Unit 07010206, on right bank 0.4 mi downstream from Coon Creek, 1.3 mi downstream from Coon Rapids dam at Coon Rapids, 6.5 mi downstream from Anoka, and at mile 864.8 upstream from Ohio River.

DRAINAGE AREA.--19,100 mi², approximately.

PERIOD OF RECORD.--June 1931 to current year. Prior to October 1931 published as "at Coon Rapids, near Anoka."

GAGE.--Water-stage recorder. Datum of gage is 804.53 ft above sea level. Prior to June 14, 1932, at site 1.2 mi upstream at different datum.

REMARKS.--Records good except those for estimated days, which are fair. Discharge during period of backwater from ice, Dec. 6 to Mar. 12, furnished from Ford Plant Dam downstream from station adjusted for time of travel, leakage through dam, and diversions to St. Paul and Minneapolis waterworks. Flow slightly regulated by six reservoirs on headwaters; total usable capacity, 1,640,600 acre-ft. Diurnal regulation caused by Coon Rapids dam 1.3 mi. above station.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3310	9360	e9940	e7000	e6860	e6600	21500	24700	11000	11000	18000	9660
2	3630	9820	e9730	e7270	e6850	e6240	26400	23800	10500	14300	17000	9540
3	3560	9870	e9430	e7220	e6700	e6420	34400	23200	9780	15400	17300	8840
4	3780	10400	e9660	e7520	e6300	e6500	40500	22100	9750	15700	16600	8670
5	3620	10500	e10900	e6740	e6570	e5970	50600	21400	9560	16700	15200	8130
6	3710	11100	e11200	e6010	e6880	e5300	57400	20600	8980	18000	14500	7960
7	3800	11000	e10700	e6150	e6760	e6150	63600	20300	8650	19200	13800	7770
8	3610	10600	e9900	e5580	e6340	e6580	67300	19700	8350	20700	13300	7610
9	3610	11000	e10200	e5320	e6390	e6610	69100	17800	8060	20800	12300	7540
10	3750	10800	e10600	e5310	e6450	e6750	69000	17100	7510	20800	12000	7440
11	3720	10700	e10800	e4650	e6370	e6690	67000	17900	7670	20800	11500	7010
12	3700	9800	e11200	e4180	e6320	e6700	64400	16400	7490	20200	11000	6890
13	3360	9170	e10800	e4510	e6340	e6650	60600	16400	6810	20100	10300	7100
14	3630	8440	e10000	e4790	e6680	e6540	55700	16200	6790	20400	9900	6840
15	3110	7920	e8770	e5660	e6350	e6400	50900	15600	6350	19800	9700	6660
16	3710	7490	e8080	e7390	e6220	e6530	47300	15100	6700	19700	9240	7050
17	4140	9920	e8390	e6150	e6220	e6810	43900	14900	6210	19900	9040	7450
18	4740	9870	e7970	e6330	e6340	e7000	41100	14400	6100	18700	8640	7650
19	4890	9850	e6740	e6080	e6130	6990	38900	14600	6130	18500	9250	7380
20	4780	10800	e5860	e6050	e6660	7140	37700	13900	6060	17900	10200	7430
21	6050	11000	e6350	e6260	e6570	7300	36000	13200	5870	17100	10800	7390
22	6310	10600	e8020	e6640	e6450	7380	34600	12500	5510	17700	10400	7110
23	6780	e10900	e7620	e6600	e6170	7800	33000	12600	5970	17600	10300	7460
24	7350	e10600	e7490	e6360	e6290	8260	31700	12000	5810	17500	10900	7470
25	7350	e9790	e6950	e6510	e6250	8290	30600	12300	6280	18800	11000	6900
26	7360	e8420	e7140	e6350	e6600	8500	29300	12500	6300	19800	10800	6750
27	7630	e7800	e7530	e6520	e6440	9320	28300	12300	6740	19700	10800	7170
28	7790	e8740	e7920	e6640	e6680	11200	27400	11900	e7330	19600	10800	6580
29	7700	e9300	e8100	e6560	---	12400	26600	11800	e8410	19500	10800	6700
30	8810	e10400	e7570	e6540	---	15100	25800	11900	e8080	18900	10600	6760
31	8900	---	e6830	e5610	---	17900	---	11500	---	18600	9940	---
TOTAL	158190	295960	272390	190500	181180	244020	1310600	500600	224750	573400	365910	224910
MEAN	5103	9865	8787	6145	6471	7872	43690	16150	7492	18500	11800	7497
MAX	8900	11100	11200	7520	6880	17900	69100	24700	11000	20800	18000	9660
MIN	3110	7490	5860	4180	6130	5300	21500	11500	5510	11000	8640	6580
AC-FT	313800	587000	540300	377900	359400	484000	2600000	992900	445800	1137000	725800	446100
CFSM	.27	.52	.46	.32	.34	.41	2.29	.85	.39	.97	.62	.39
IN.	.31	.58	.53	.37	.35	.48	2.55	.97	.44	1.12	.71	.44

e Estimated

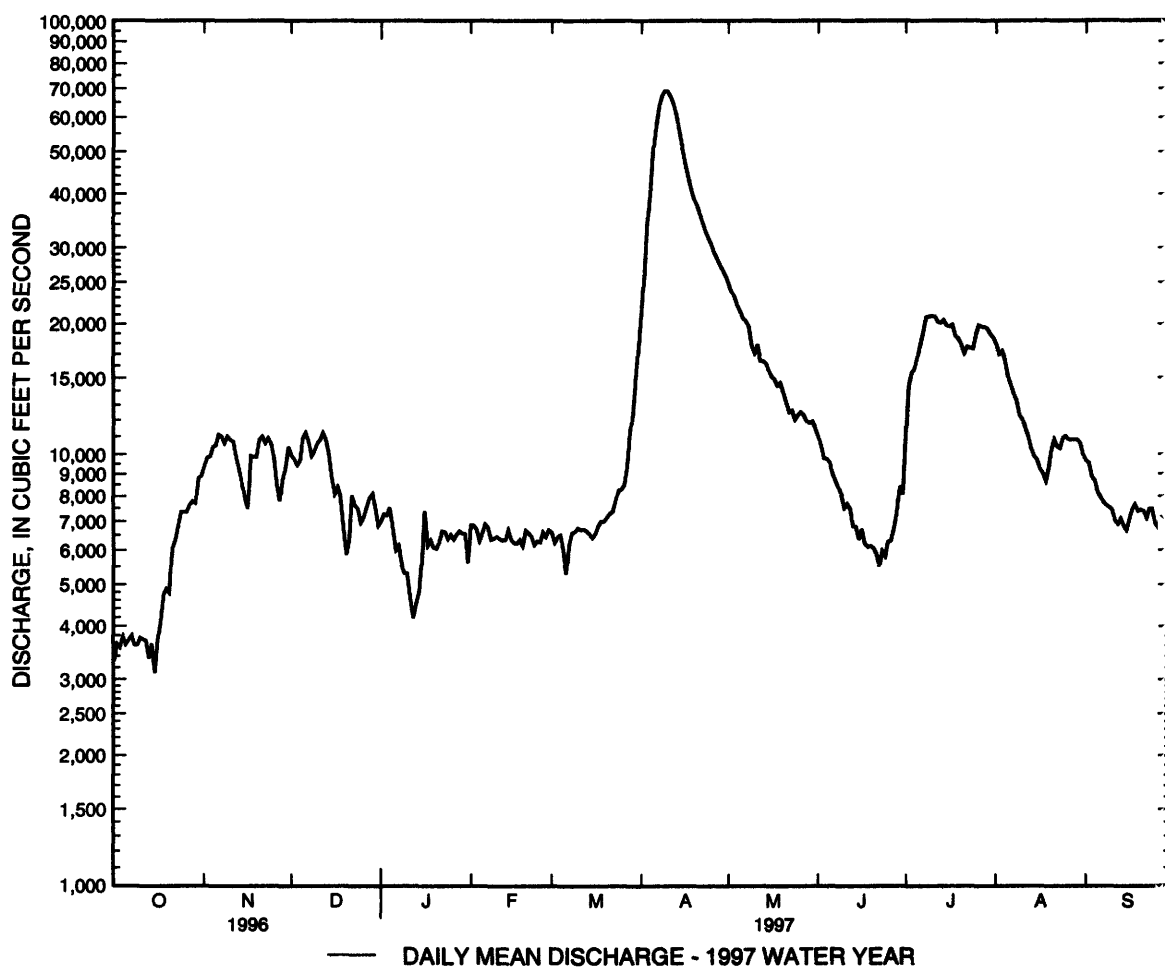
UPPER MISSISSIPPI RIVER BASIN

05288500 MISSISSIPPI RIVER NEAR ANOKA, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	6436	6244	4805	4229	4122	7304	17660	14910	11390	8673	6066	5839
MAX	21250	22800	10800	8304	9948	23410	43690	39760	29910	27240	22490	23570
(WY)	1987	1972	1972	1986	1966	1966	1997	1986	1943	1993	1972	1986
MIN	1128	1152	1006	935	1079	1602	3575	2796	1646	1022	715	888
(WY)	1937	1937	1935	1935	1933	1940	1959	1934	1934	1934	1934	1934

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1931 - 1997
ANNUAL TOTAL	3903980	4542410	
ANNUAL MEAN	10670	12440	8173
HIGHEST ANNUAL MEAN			17750
LOWEST ANNUAL MEAN			1603
HIGHEST DAILY MEAN	36000	Apr 23 69100	Apr 9 90300
LOWEST DAILY MEAN	2580	Sep 9 3110	Oct 15 602
ANNUAL SEVEN-DAY MINIMUM	3040	Sep 3 3550	Oct 9 646
INSTANTANEOUS PEAK FLOW		69800	Apr 9 91000
INSTANTANEOUS PEAK STAGE		16.44	Apr 9 19.53
INSTANTANEOUS LOW FLOW		2760	Oct 15 529 ^a
ANNUAL RUNOFF (AC-FT)	7744000	9010000	5921000
ANNUAL RUNOFF (CFSM)	.56	.65	.43
ANNUAL RUNOFF (INCHES)	7.60	8.85	5.81
10 PERCENT EXCEEDS	23900	20800	17800
50 PERCENT EXCEEDS	7940	8440	5650
90 PERCENT EXCEEDS	3620	5990	2080

^a Result of regulation.

UPPER MISSISSIPPI RIVER BASIN

05288500 MISSISSIPPI RIVER NEAR ANOKA, MN--Continued
(National Water-Quality Assessment Station)

WATER-QUALITY RECORDS

LOCATION.--Water-quality samples were collected near Coon Rapids dam.

PERIOD OF RECORD.--Water years 1963-67, 1975 to current year.

WATER TEMPERATURES:

Once-daily (instantaneous) record.--Water years 1976, 77, 79, 80, 82 to 96 (discontinued).

Hourly record.--May 1996 to current year.

SPECIFIC CONDUCTANCE.--May 1996 to current year.

SUSPENDED-SEDIMENT DISCHARGE.--Daily record, August 1975 to September 1996, (discontinued).

INSTRUMENTATION.--Electronic data logger and water temperature/specific conductance sensors since May 1996, provides continuous record. Sensors located at gage.

REMARKS.--Water temperature records at sensor rounded to within 0.5 °C. Field readings of temperature and conductance at the sensor were compared with water-quality instrument readings of same on Oct. 9, Nov. 27, Dec. 6, Jan. 10, Mar. 25, and June 25. Variations of temperature were within 0.5 °C; variations of conductance were within 39% (corrections applied).

EXTREMES FOR PERIOD OF DAILY RECORD:

WATER TEMPERATURES.--Maximum observed, 31.0 °C, Aug. 25, 26, 1976, July 19, 1977, July 13, 1995; minimum, 0.0 °C, on many days during winter each year.

SPECIFIC CONDUCTANCE.--Maximum, 646 µs/cm, June 22, 1996; minimum, 128 µs/cm, Nov. 17, 18, 1996.

EXTREMES FOR CURRENT YEAR:

WATER TEMPERATURES.--Maximum, 27.0 °C, July 18; minimum, 0.0 °C, on many days during winter.

SPECIFIC CONDUCTANCE.--Maximum, 545 µs/cm, Mar. 31, Apr. 1; minimum, 128 µs/cm, Nov. 17, 18.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	18.0	15.5	17.0	1.5	.5	1.0	.5	.0	.5	.0	.0	.0
2	18.0	15.0	16.5	1.5	.5	1.0	.0	.0	.0	.0	.0	.0
3	15.0	13.5	14.0	3.0	1.0	2.0	.0	.0	.0	.0	.0	.0
4	13.5	12.5	13.0	4.5	2.5	3.5	.0	.0	.0	.0	.0	.0
5	15.5	12.5	14.0	5.0	4.0	4.5	.0	.0	.0	.0	.0	.0
6	16.5	15.0	15.5	5.5	5.0	5.0	.5	.0	.5	.0	.0	.0
7	15.5	14.0	14.5	5.0	3.5	4.5	.5	.0	.0	.0	.0	.0
8	14.5	13.0	13.5	4.0	3.0	3.5	.0	.0	.0	.0	.0	.0
9	13.5	13.0	13.5	3.0	1.5	2.5	.0	.0	.0	.0	.0	.0
10	13.0	7.0	10.0	1.5	1.0	1.0	.5	.0	.0	---	---	---
11	10.5	7.0	8.5	1.0	.5	.5	1.0	.5	.5	---	---	---
12	12.5	8.5	10.0	1.5	.5	.5	1.5	1.0	1.5	---	---	---
13	14.0	10.0	11.5	1.5	.5	1.0	1.5	.5	1.0	---	---	---
14	13.0	10.0	11.0	1.5	.5	.5	.5	.0	.0	---	---	---
15	14.0	10.5	12.0	.5	.5	.5	.0	.0	.0	---	---	---
16	13.5	10.0	11.5	.5	.5	.5	.0	.0	.0	---	---	---
17	12.0	9.5	11.0	.5	.5	.5	.0	.0	.0	---	---	---
18	9.5	7.5	8.0	.5	.5	.5	.0	.0	.0	---	---	---
19	8.5	6.0	7.5	.5	.5	.5	.0	.0	.0	---	---	---
20	8.5	7.0	7.5	.5	.5	.5	.0	.0	.0	---	---	---
21	9.0	8.0	8.5	.5	.0	.5	.0	.0	.0	---	---	---
22	8.0	6.5	7.0	.5	.0	.0	.0	.0	.0	---	---	---
23	7.0	6.0	6.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
24	6.0	5.5	6.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
25	8.0	5.5	6.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
26	10.5	8.0	9.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
27	10.5	9.0	10.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
28	9.0	7.0	8.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
29	7.5	6.5	7.0	.5	.0	.0	.0	.0	.0	.0	.0	.0
30	7.5	3.0	5.5	1.0	.5	.5	.0	.0	.0	.0	.0	.0
31	3.0	1.0	2.0	---	---	---	.0	.0	.0	.0	.0	.0
MONTH	18.0	1.0	10.2	5.5	.0	1.2	1.5	.0	.1	---	---	---

UPPER MISSISSIPPI RIVER BASIN
05288500 MISSISSIPPI RIVER NEAR ANOKA, MN--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	.0	.0	.0	2.0	1.5	1.5	4.0	2.0	3.0	13.0	11.5	12.0
2	.0	.0	.0	1.5	1.0	1.5	4.5	4.0	4.0	13.0	12.0	12.5
3	.0	.0	.0	1.5	1.0	1.5	4.5	3.0	3.5	12.5	11.5	12.5
4	.0	.0	.0	1.5	1.0	1.0	4.5	4.0	4.5	13.5	12.0	12.5
5	.0	.0	.0	2.0	1.0	1.5	4.5	3.5	4.0	13.5	13.0	13.5
6	.0	.0	.0	1.0	.5	.5	4.5	3.0	4.0	14.0	13.0	13.5
7	.0	.0	.0	1.0	.5	.5	3.0	1.5	2.0	14.0	13.5	14.0
8	.0	.0	.0	2.0	.0	1.0	1.5	.5	1.0	13.5	12.5	13.0
9	.0	.0	.0	3.5	2.0	2.5	2.0	.5	1.0	13.0	12.0	12.5
10	.0	.0	.0	3.5	2.5	3.0	2.0	1.5	1.5	13.5	12.5	13.0
11	.0	.0	.0	3.0	2.5	2.5	2.0	1.5	2.0	13.5	12.5	13.5
12	.0	.0	.0	3.0	2.0	2.5	3.0	2.0	2.5	12.5	11.5	12.0
13	.0	.0	.0	2.0	.0	1.0	4.0	2.5	3.5	11.5	11.0	11.5
14	.5	.0	.0	.0	.0	.0	5.5	4.0	4.5	11.0	10.5	11.0
15	.0	.0	.0	.5	.0	.0	6.5	5.5	6.0	10.5	10.0	10.5
16	.0	.0	.0	1.5	.0	.5	6.0	5.5	6.0	11.5	10.5	11.0
17	1.0	.0	.5	2.5	1.5	2.0	7.0	5.5	6.5	13.0	11.5	12.5
18	1.5	1.0	1.5	3.0	2.0	2.5	7.5	7.0	7.0	14.5	13.0	13.5
19	1.5	1.0	1.0	3.5	2.0	2.5	8.5	7.0	8.0	14.5	13.5	14.0
20	2.0	1.0	1.5	4.0	2.5	3.0	10.0	8.0	9.0	14.0	13.0	13.5
21	2.0	1.0	1.5	4.0	3.0	3.0	11.0	9.5	10.0	15.0	13.5	14.0
22	1.0	.5	.5	4.0	2.5	3.0	11.5	10.0	10.5	15.0	14.5	14.5
23	.5	.0	.5	4.0	2.5	3.0	11.5	10.5	11.0	15.0	14.0	14.5
24	.5	.0	.0	2.5	.5	1.5	11.5	10.5	11.0	15.0	14.5	14.5
25	1.5	.0	.5	2.0	.5	1.5	12.0	10.5	11.5	15.0	14.5	14.5
26	2.5	1.5	2.0	3.5	1.5	2.5	12.5	11.5	12.0	15.0	14.5	14.5
27	2.0	1.5	1.5	4.5	3.0	4.0	13.0	11.5	12.5	15.0	14.0	14.5
28	1.5	1.0	1.5	4.0	2.0	3.0	14.0	12.0	13.0	15.0	14.5	14.5
29	---	---	---	3.0	1.5	2.5	14.0	13.0	14.0	14.5	14.0	14.0
30	---	---	---	3.0	1.0	2.0	14.0	12.0	13.0	15.5	14.0	14.5
31	---	---	---	2.5	1.0	1.5	---	---	---	17.5	15.5	16.5
MONTH	2.5	.0	.4	4.5	.0	1.9	14.0	.5	6.7	17.5	10.0	13.3

UPPER MISSISSIPPI RIVER BASIN
05288500 MISSISSIPPI RIVER NEAR ANOKA, MN--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	18.5	17.5	18.0	25.5	24.5	25.0	24.5	23.0	24.0	24.0	23.5	24.0
2	19.5	18.5	19.0	25.0	22.5	23.5	25.0	24.0	24.5	24.0	23.0	23.5
3	20.0	19.5	19.5	22.5	20.5	21.5	25.5	24.5	25.0	23.0	21.5	22.0
4	20.5	20.0	20.5	21.0	20.0	20.5	25.5	25.0	25.5	21.5	20.5	21.0
5	21.0	20.5	21.0	21.0	20.5	21.0	25.5	24.5	25.0	21.5	20.5	21.0
6	21.5	21.0	21.0	21.0	20.0	20.5	25.0	24.0	24.5	22.5	21.5	22.0
7	21.5	21.0	21.0	20.5	19.0	20.0	25.5	24.5	25.0	22.0	21.0	22.0
8	21.5	21.0	21.0	19.0	19.0	19.0	25.5	24.5	25.0	21.5	20.5	21.5
9	22.0	21.5	21.5	20.0	18.5	19.0	25.0	24.0	24.5	22.0	21.0	21.5
10	22.5	22.0	22.5	20.5	19.5	20.0	24.0	22.5	23.0	21.5	20.0	20.5
11	23.0	22.5	23.0	22.0	20.5	21.0	22.5	22.0	22.5	21.0	20.0	20.5
12	23.5	23.0	23.0	23.0	22.0	22.5	22.5	22.0	22.0	21.0	20.0	20.5
13	24.0	23.0	23.5	24.5	22.5	23.5	22.0	21.5	22.0	20.5	19.5	20.0
14	23.5	23.0	23.5	25.0	24.0	24.5	22.0	20.5	21.5	20.5	19.5	20.0
15	23.0	22.0	23.0	25.5	24.0	24.5	21.5	20.5	21.0	20.5	20.0	20.5
16	22.0	21.0	21.5	26.5	25.0	25.5	23.0	21.5	22.5	20.5	19.5	20.0
17	21.5	20.5	21.0	27.0	26.0	26.5	23.0	21.0	22.0	20.0	19.5	19.5
18	20.5	20.0	20.5	27.0	26.5	27.0	21.0	20.5	20.5	20.5	19.5	20.0
19	20.5	20.0	20.0	26.5	25.0	25.5	20.5	19.0	20.0	21.0	20.0	20.5
20	22.0	20.5	21.5	26.0	25.0	25.5	19.5	19.0	19.0	20.0	18.0	19.0
21	23.0	21.5	22.5	26.0	24.5	25.0	20.5	19.5	20.0	18.0	17.5	18.0
22	24.0	22.5	23.0	24.5	23.0	23.5	21.0	20.0	20.5	18.0	17.0	17.5
23	24.5	23.0	23.5	23.0	22.5	23.0	21.5	20.5	21.0	17.5	16.5	17.0
24	24.5	24.0	24.5	23.0	23.0	23.0	22.0	21.5	21.5	17.5	17.0	17.0
25	25.0	23.5	24.0	24.0	22.5	23.5	22.5	21.5	22.0	18.5	17.5	18.0
26	25.0	23.5	24.0	25.5	23.5	24.5	23.0	22.0	22.5	19.0	18.0	18.5
27	26.0	24.0	25.0	26.0	25.0	25.5	23.5	23.0	23.5	19.0	18.0	18.5
28	25.0	23.5	24.5	26.0	25.0	25.5	23.5	23.0	23.0	19.0	18.0	18.5
29	23.5	22.0	22.5	25.5	24.5	25.0	23.5	22.5	23.0	18.0	16.5	17.5
30	24.5	22.0	23.0	25.5	24.5	25.0	23.5	22.5	23.0	16.5	15.5	16.0
31	---	---	---	25.0	24.0	24.5	24.0	23.0	23.5	---	---	---
MONTH	26.0	17.5	22.1	27.0	18.5	23.4	25.5	19.0	22.7	24.0	15.5	19.9

UPPER MISSISSIPPI RIVER BASIN
05288500 MISSISSIPPI RIVER NEAR ANOKA, MN--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	313	289	301	291	225	264	397	364	383	373	359	364
2	296	276	286	285	276	278	415	393	407	375	355	362
3	291	261	274	286	275	280	420	412	417	368	335	345
4	294	253	270	292	286	289	428	382	419	372	344	355
5	257	224	241	292	288	290	382	352	358	354	339	342
6	227	210	218	288	275	280	365	353	360	362	342	349
7	215	193	205	275	259	269	437	363	417	360	349	353
8	212	180	193	259	252	254	400	360	370	378	352	356
9	379	184	328	253	250	251	369	362	365	369	347	353
10	475	331	374	259	252	254	366	357	360	---	---	---
11	339	327	332	272	259	266	367	358	362	---	---	---
12	344	331	337	287	272	282	391	367	376	---	---	---
13	351	337	343	297	285	292	391	386	388	---	---	---
14	347	338	342	305	295	300	389	387	388	---	---	---
15	351	337	343	301	297	299	389	387	388	---	---	---
16	346	327	339	297	176	263	391	387	388	---	---	---
17	327	291	308	176	128	135	396	367	375	---	---	---
18	293	267	282	141	128	133	379	375	377	---	---	---
19	292	280	286	172	141	158	378	367	372	---	---	---
20	302	292	296	194	172	184	380	373	375	---	---	---
21	334	302	312	351	194	248	382	368	377	---	---	---
22	340	328	333	358	351	356	375	366	371	---	---	---
23	335	273	304	359	351	355	385	375	381	371	355	361
24	273	259	264	369	355	364	391	385	388	382	360	367
25	269	257	262	367	362	365	392	389	390	384	361	364
26	288	269	279	368	359	363	391	362	383	389	362	368
27	295	288	292	376	361	368	376	356	362	386	367	371
28	300	290	295	369	352	356	376	356	360	391	366	371
29	297	272	291	368	354	360	382	349	357	391	368	381
30	272	222	240	366	344	349	385	361	370	392	369	381
31	225	217	221	---	---	---	375	361	366	390	364	379
MONTH	475	180	290	376	128	284	437	349	379	---	---	---

UPPER MISSISSIPPI RIVER BASIN
05288500 MISSISSIPPI RIVER NEAR ANOKA, MN--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	388	364	380	427	400	412	545	356	385	371	350	360
2	391	365	379	420	406	408	370	344	352	396	371	384
3	394	370	384	414	407	409	351	311	328	399	394	396
4	394	371	377	431	409	414	318	282	302	406	395	401
5	394	369	374	425	405	410	301	275	287	409	405	407
6	387	369	372	426	410	413	300	284	296	428	409	419
7	391	370	374	418	410	413	---	---	---	436	428	432
8	409	379	388	423	409	412	---	---	---	436	433	435
9	402	376	384	450	409	420	298	290	294	434	429	432
10	409	377	387	433	410	419	305	298	302	429	425	427
11	415	394	407	433	407	414	305	302	303	425	419	422
12	425	372	397	416	412	415	308	301	304	419	413	415
13	400	373	380	427	415	418	310	301	304	413	408	410
14	399	374	381	425	414	419	318	310	315	408	402	405
15	403	377	387	428	415	420	321	310	317	402	396	399
16	406	380	390	434	415	425	322	310	316	396	392	394
17	408	380	394	433	422	427	335	321	328	392	388	390
18	406	383	391	428	421	425	335	333	334	389	386	387
19	411	388	392	436	422	428	349	335	343	387	384	385
20	416	390	400	447	423	430	350	346	348	389	382	384
21	409	392	396	442	424	430	350	343	348	386	380	382
22	420	392	397	436	427	431	343	334	341	381	374	377
23	414	396	400	438	428	433	334	325	328	374	366	370
24	415	395	401	450	430	439	353	334	342	367	358	362
25	425	398	404	464	450	461	360	353	357	358	352	355
26	422	399	403	462	445	451	367	360	364	352	349	350
27	419	399	403	457	450	453	373	358	365	350	348	349
28	415	399	403	456	436	447	364	357	360	350	347	349
29	---	---	---	447	432	442	---	---	---	367	346	348
30	---	---	---	460	447	451	358	347	352	366	338	346
31	---	---	---	545	460	485	---	---	---	358	330	335
MONTH	425	364	390	545	400	428	---	---	---	436	330	387

UPPER MISSISSIPPI RIVER BASIN
05288500 MISSISSIPPI RIVER NEAR ANOKA, MN--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	330	322	326	250	196	221	271	261	266	336	332	334
2	322	317	319	216	177	188	270	266	268	333	325	329
3	318	317	318	187	171	178	267	262	265	330	326	328
4	323	318	320	174	168	169	262	258	261	331	327	329
5	341	322	325	181	170	174	268	255	262	329	318	325
6	341	297	313	176	170	173	268	264	266	323	312	318
7	331	327	329	179	173	175	267	259	263	314	311	312
8	329	325	327	182	174	178	267	260	263	324	313	317
9	328	325	326	192	182	188	275	266	270	322	316	319
10	331	327	329	197	192	195	275	271	272	317	310	312
11	333	330	332	203	197	200	271	264	267	317	310	313
12	337	332	335	208	203	206	268	263	265	319	314	317
13	340	337	339	210	208	208	264	258	261	322	316	319
14	344	340	342	214	208	212	262	259	260	324	315	320
15	346	342	344	220	214	218	263	260	262	325	314	319
16	346	343	344	222	219	221	263	260	261	325	315	320
17	359	342	350	221	216	219	265	259	261	317	309	312
18	358	355	357	218	216	217	267	265	266	319	315	317
19	357	354	355	220	216	218	268	258	263	327	318	324
20	356	351	354	280	218	243	266	257	262	325	319	322
21	351	346	349	246	213	222	267	265	266	322	320	321
22	346	337	343	222	210	214	265	260	262	326	322	324
23	337	325	333	225	220	222	275	264	269	329	321	325
24	325	315	319	220	207	213	281	275	278	323	320	322
25	325	314	318	213	207	210	289	279	283	345	320	330
26	324	306	316	221	212	215	295	289	292	365	332	340
27	322	306	314	227	221	225	298	291	294	342	336	338
28	381	299	347	235	226	231	310	297	303	342	334	336
29	357	240	258	243	235	240	316	306	311	353	337	347
30	248	240	244	251	243	247	321	316	318	356	347	353
31	---	---	---	261	250	255	336	309	316	---	---	---
MONTH	381	240	328	280	168	210	336	255	273	365	309	325

UPPER MISSISSIPPI RIVER BASIN

05288500 MISSISSIPPI RIVER NEAR ANOKA, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	OXYGEN, DIS- SOLVED (MG/L) (00300)
OCT 09...	1015	3550	359	378	8.5	8.2	13.0	742	9.6	94
NOV 13...	1130	8440	232	319	7.8	7.9	0.0	760	13.7	93
DEC 06...	1045	23400	319	337	7.9	7.3	0.5	731	12.1	88
JAN 10...	0940	22400	377	399	7.5	7.7	0.0	--	11.7	--
APR 10...	1105	69100	219	238	7.5	7.5	1.5	753	12.9	93
AUG 29...	1140	10700	424	409	8.1	8.2	22.5	742	7.5	89
SEP 08...	1045	7690	400	382	8.2	8.2	21.0	742	8.7	100

DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANI DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
OCT 09...	180	168	171	199	5	0.020	0.010	0.30	0.50	0.120
NOV 13...	150	132	140	161	0	0.020	<0.010	0.50	0.70	0.310
DEC 06...	160	142	150	173	0	0.110	0.010	0.60	0.60	0.350
JAN 10...	190	172	180	210	0	0.180	0.020	0.60	0.70	0.510
APR 10...	100	82	92	100	0	0.220	0.030	0.90	1.2	1.10
AUG 29...	200	182	182	222	0	0.148	<0.010	0.61	1.1	0.727
SEP 08...	190	173	180	211	0	<0.015	<0.010	0.53	0.90	0.451

UPPER MISSISSIPPI RIVER BASIN

05288500 MISSISSIPPI RIVER NEAR ANOKA, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDE TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)
OCT 09...	0.030	<0.010	<0.010	7.0	0.80	44	16	8.8	0.3	2.1
NOV 13...	0.050	0.020	0.020	10	0.60	37	13	6.9	0.2	2.1
DEC 06...	0.040	0.020	0.020	10	0.40	41	14	6.9	0.2	2.1
JAN 10...	<0.010	0.010	0.040	7.2	0.30	47	17	8.7	0.3	2.3
APR 10...	0.150	0.100	0.070	9.4	2.2	27	8.2	3.4	0.1	3.3
AUG 29...	0.109	0.077	0.061	8.4	1.5	51	19	7.2	0.2	2.5
SEP 08...	0.092	0.032	0.040	7.7	1.0	48	18	7.7	0.2	2.3

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 09...	11	14	0.10	6.8	14	9.0	222	206	8	80
NOV 13...	9.0	11	0.10	9.8	66	18	191	170	10	86
DEC 06...	8.8	12	<0.10	11	110	18	202	183	7	85
JAN 10...	12	14	0.10	12	81	34	241	219	3	90
APR 10...	6.6	11	0.10	9.1	180	33	150	124	95	42
AUG 29...	11	22	0.19	14	11	1.9	272	240	16	90
SEP 08...	11	19	0.15	13	12	1.6	249	225	16	91

UPPER MISSISSIPPI RIVER BASIN

05288705 SHINGLE CREEK AT QUEEN AVE IN MINNEAPOLIS, MN

LOCATION.-- Lat 45°03'00", long 93°18'36", in NE¹/₄NW¹/₄ sec. 11, T.118 N., R.21 W., Hennepin County, Hydrologic Unit 07010206, at bridge over Shingle Creek at intersection of Queen Avenue North and 52nd Avenue North in Minneapolis.

DRAINAGE AREA.-- 28.2 mi².

PERIOD OF RECORD.-- May 1996 to current year.

GAGE.-- Water-stage recorder. Elevation of gage is 850 ft above mean sea level (from topographic map).

REMARKD.-- Records fair.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.2	17	18	e8.4	e6.6	e7.2	68	15	8.5	47	53	15
2	1.1	15	e16	e8.7	e6.3	e7.5	61	16	7.4	99	47	15
3	.44	13	e15	e8.8	e6.1	e7.6	56	19	6.6	66	44	13
4	.30	15	13	e8.7	e5.7	e7.7	53	18	6.8	58	37	11
5	e.24	15	12	e8.0	e5.4	e7.3	56	17	9.2	47	36	12
6	e.19	13	11	e7.5	e5.3	e6.7	61	15	9.0	35	34	11
7	.17	10	10	e7.0	e5.2	e6.3	54	16	8.7	e27	29	10
8	e.15	8.4	9.3	e8.1	e5.2	e7.0	47	16	6.6	e24	22	15
9	.14	6.7	8.8	e8.3	e5.2	e9.0	38	14	7.1	e24	18	37
10	e.14	5.1	8.5	e8.1	e5.1	e13	32	13	6.4	e27	16	33
11	e.14	4.1	8.4	e7.5	e5.1	e13	28	12	5.0	45	13	24
12	.14	3.3	9.1	e6.8	e5.1	e11	26	11	4.4	26	12	17
13	.13	2.7	8.5	e6.4	e5.1	e10	23	9.9	3.7	50	11	12
14	.13	2.5	e8.3	e6.7	e5.0	e9.9	22	13	2.4	63	12	10
15	1.4	8.1	e8.2	e7.0	e5.0	e9.8	21	12	4.3	42	11	9.0
16	7.3	89	e8.1	e6.6	e5.0	e12	21	11	3.7	32	10	41
17	38	103	8.1	e6.5	e5.4	e14	20	11	3.5	26	9.0	33
18	19	99	8.2	e6.4	e6.1	10	20	19	4.0	20	8.4	29
19	21	79	e7.4	e7.0	e6.1	11	21	19	5.4	25	64	25
20	14	66	e6.7	e7.5	e6.4	14	20	16	7.9	26	71	18
21	11	54	e8.0	e8.1	e6.6	21	19	14	6.2	24	61	13
22	10	42	e8.0	e8.1	e6.5	28	18	13	4.2	99	52	11
23	26	31	e8.0	e7.9	e6.0	34	21	13	3.4	94	43	9.9
24	17	e28	e7.4	e7.6	e5.7	37	17	13	8.6	94	35	8.8
25	15	e24	e6.9	e7.0	e5.9	38	13	9.8	7.3	104	29	7.8
26	12	21	e6.6	e6.5	e6.1	43	14	8.1	4.2	94	24	9.2
27	9.8	18	e7.1	e6.1	e6.4	57	14	7.4	2.6	87	20	12
28	7.6	17	e7.7	e5.6	e6.7	73	14	6.9	12	80	16	16
29	23	17	e7.7	e5.5	---	82	16	13	35	71	14	10
30	26	19	e7.7	e5.7	---	77	17	12	20	64	40	7.6
31	22	---	e7.7	e6.8	---	70	---	10	---	57	19	---
TOTAL	284.71	845.9	285.4	224.9	160.3	754.0	911	413.1	224.1	1677	910.4	495.3
MEAN	9.18	28.2	9.21	7.25	5.72	24.3	30.4	13.3	7.47	54.1	29.4	16.5
MAX	38	103	18	8.8	6.7	82	68	19	35	104	71	41
MIN	.13	2.5	6.6	5.5	5.0	6.3	13	6.9	2.4	20	8.4	7.6
AC-FT	565	1680	566	446	318	1500	1810	819	445	3330	1810	982

e Estimated

UPPER MISSISSIPPI RIVER BASIN

05288705 SHINGLE CREEK AT QUEEN AVE IN MINNEAPOLIS, MN.--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 1997, BY WATER YEAR (WY)

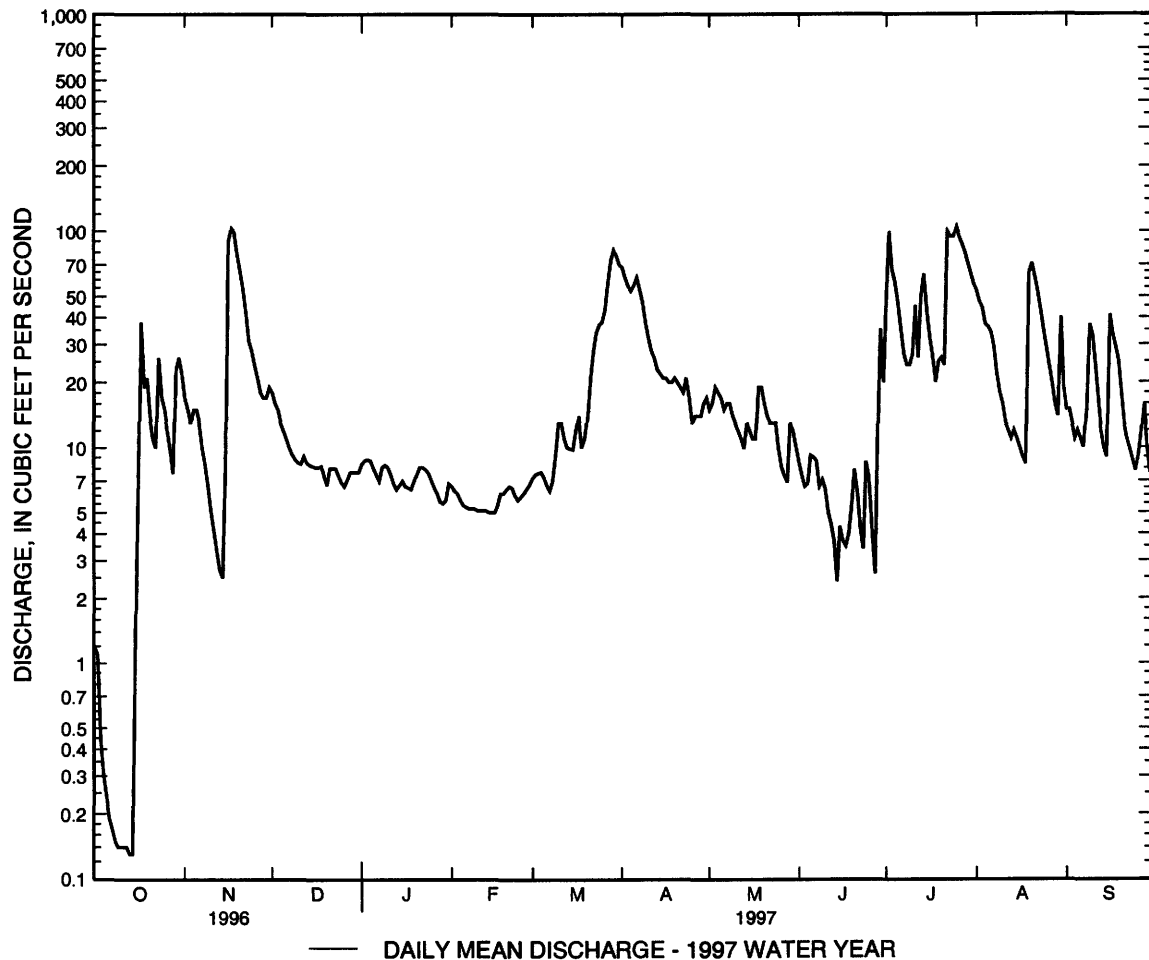
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	9.18	28.2	9.21	7.25	5.72	24.3	30.4	13.3	21.2	31.0	17.2	5.72
MAX	9.18	28.2	9.21	7.25	5.72	24.3	30.4	13.3	34.8	54.1	29.4	16.5
(WY)	1997	1997	1997	1997	1997	1997	1997	1997	1996	1997	1997	1997
MIN	9.18	28.2	9.21	7.25	5.72	24.3	30.4	13.3	7.47	7.92	5.04	2.92
(WY)	1997	1997	1997	1997	1997	1997	1997	1997	1997	1996	1996	1996

SUMMARY STATISTICS

FOR 1997 WATER YEAR

WATER YEARS 1996 - 1997

ANNUAL TOTAL	7186.11			
ANNUAL MEAN	19.7		19.7	
HIGHEST ANNUAL MEAN			19.7	1997
LOWEST ANNUAL MEAN			19.7	1997
HIGHEST DAILY MEAN	104	Jul 25	136	May 19 1996
LOWEST DAILY MEAN	.13	Oct 13	.13	Oct 13 1996
ANNUAL SEVEN-DAY MINIMUM	.14	Oct 8	.14	Oct 8 1996
INSTANTANEOUS PEAK FLOW	225	Jul 1	225	Jul 1 1997
INSTANTANEOUS PEAK STAGE	13.07	Jul 1	13.07	Jul 1 1997
INSTANTANEOUS LOW FLOW	.11	Oct 11	.11	Oct 11 1996
ANNUAL RUNOFF (AC-FT)	14250		14260	
10 PERCENT EXCEEDS	52		53	
50 PERCENT EXCEEDS	12		11	
90 PERCENT EXCEEDS	5.1		3.4	



UPPER MISSISSIPPI RIVER BASIN

05288705 SHINGLE CREEK AT QUEEN AVE IN MINNEAPOLIS, MN.--Continued
(National Water-Quality Assessment Station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1996 to current year

PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: May 1996 to current year.

SPECIFIC CONDUCTANCE: May 1996 to current year.

REVISIONS.-- Figures of specific conductance for the period May 8, 1996 to June 9, 1996 published in the 1996 Water Resources Data Report were in error, and have been corrected in the District files.

INSTRUMENTATION.--Water-quality monitor since May 1996, provides continuous recordings. Sensor located at gage.

REMARKS.--Records represent water temperature at sensor within 0.5°C. Temperature and conductance at the sensor was compared with the average for the river by cross section at least monthly. Variation of temperature was within 0.5°C; variation of conductance was within 50% (corrections applied).

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum, 28.0°C, June 23, July 16, 17; minimum, 0.0°C, on many days during winter.

SPECIFIC CONDUCTANCE: Maximum, 4220 µs/cm, Jan. 31, 1997; minimum, 92 µs/cm, July 11, 1997.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum, 28.0 °C, June 23, July 16, 17; minimum, 0.0 °C, on many days during winter.

SPECIFIC CONDUCTANCE: Maximum, 4220 µs/cm, Jan. 31; minimum, 92 µs/cm, July 11.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	18.5	14.0	16.0	1.5	.5	1.0	.0	.0	.0	.0	.0	.0
2	18.5	8.5	13.0	1.5	.5	1.0	.0	.0	.0	.5	.0	.0
3	---	---	---	3.5	1.0	2.0	.0	.0	.0	.5	.0	.5
4	---	---	---	6.0	3.0	4.0	.0	.0	.0	.5	.0	.0
5	---	---	---	5.0	4.5	4.5	.5	.0	.0	.0	.0	.0
6	---	---	---	5.5	4.5	5.0	.5	.0	.0	.0	.0	.0
7	---	---	---	6.0	4.0	4.5	.5	.0	.0	.0	.0	.0
8	---	---	---	4.5	3.0	3.5	.5	.0	.5	.0	.0	.0
9	---	---	---	3.0	1.5	2.0	.5	.0	.5	.0	.0	.0
10	---	---	---	1.5	.0	.5	.5	.0	.5	.0	.0	.0
11	---	---	---	.5	.0	.0	1.0	.5	.5	.0	.0	.0
12	---	---	---	.5	.0	.0	1.5	.5	1.0	.5	.0	.0
13	---	---	---	.5	.0	.0	1.0	.0	.5	.5	.0	.0
14	---	---	---	.0	.0	.0	.5	.0	.5	.0	.0	.0
15	17.0	10.5	14.0	1.0	.0	.0	.0	.0	.0	.0	.0	.0
16	23.5	9.0	14.0	2.0	.5	1.0	.5	.0	.5	.0	.0	.0
17	15.0	11.0	12.5	1.5	.0	.5	.5	.5	.5	.0	.0	.0
18	11.0	8.5	9.5	.5	.0	.0	.5	.0	.5	.0	.0	.0
19	9.0	7.5	8.0	.5	.0	.0	.5	.0	.5	.0	.0	.0
20	9.0	8.0	8.5	.0	.0	.0	.5	.0	.5	.0	.0	.0
21	10.0	8.5	9.0	.5	.0	.0	.5	.5	.5	.0	.0	.0
22	9.0	7.5	8.0	1.0	.0	.0	.5	.0	.0	.5	.0	.0
23	8.0	6.5	7.0	.5	.0	.0	.0	.0	.0	.5	.0	.0
24	6.5	6.0	6.5	.0	.0	.0	.0	.0	.0	.5	.0	.0
25	8.5	6.0	7.0	.0	.0	.0	.0	.0	.0	.5	.0	.0
26	11.0	8.5	9.5	1.0	.0	.0	.5	.0	.0	.5	.0	.0
27	10.5	9.0	10.0	.0	.0	.0	.5	.0	.0	.5	.0	.0
28	10.0	7.5	8.5	.5	.0	.0	.0	.0	.0	.5	.0	.0
29	9.5	7.5	8.5	.5	.0	.0	.0	.0	.0	.5	.0	.0
30	9.5	4.0	6.5	.5	.0	.5	.0	.0	.0	.5	.0	.0
31	4.0	1.0	2.0	---	---	---	.0	.0	.0	.5	.0	.0
MONTH	---	---	---	6.0	.0	1.0	1.5	.0	.2	.5	.0	.0

UPPER MISSISSIPPI RIVER BASIN

05288705 SHINGLE CREEK AT QUEEN AVE IN MINNEAPOLIS, MN.--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	.5	.0	.0	.5	.0	.0	7.5	3.0	5.0	13.0	8.5	11.0
2	.5	.0	.0	.5	.0	.0	7.5	5.5	6.5	13.5	11.5	12.5
3	.5	.0	.0	.5	.0	.0	9.5	5.0	7.5	14.0	10.5	12.0
4	.5	.0	.0	.5	.0	.0	9.5	8.0	9.0	15.0	11.5	13.5
5	.5	.0	.0	.5	.0	.0	11.0	9.0	9.5	16.0	14.0	15.0
6	.5	.0	.0	.5	.0	.0	10.0	3.0	7.0	16.5	12.0	14.5
7	.5	.0	.0	.5	.0	.0	3.0	.0	1.5	15.5	13.5	14.0
8	.5	.0	.0	.5	.0	.0	2.5	.0	1.5	13.5	11.0	12.5
9	.5	.0	.0	1.0	.0	.5	5.5	1.5	3.5	14.0	9.5	12.0
10	.5	.0	.0	1.5	.0	.5	5.0	3.5	4.5	16.5	12.0	14.0
11	.5	.0	.0	1.5	.0	.5	5.5	3.0	4.5	15.5	12.0	14.5
12	.5	.0	.0	1.0	.0	.5	7.0	4.0	5.5	12.5	10.0	11.0
13	.5	.0	.0	.0	.0	.0	9.0	5.0	7.0	11.0	9.0	10.0
14	.5	.0	.0	.0	.0	.0	10.5	7.0	9.0	11.5	9.5	10.0
15	.5	.0	.0	.5	.0	.0	10.0	8.5	9.5	12.0	8.0	10.0
16	.5	.0	.0	.5	.0	.0	8.5	6.5	7.0	14.5	9.5	12.0
17	.5	.0	.0	.5	.0	.0	10.0	5.5	7.5	17.5	12.5	15.0
18	.5	.0	.0	1.5	.0	.5	9.5	8.5	9.5	18.5	15.5	17.0
19	.5	.0	.0	2.5	.0	1.0	12.5	8.0	10.5	17.0	13.5	15.0
20	1.0	.0	.0	3.5	.5	2.0	14.0	11.0	12.5	16.0	12.0	14.0
21	.5	.0	.0	3.5	2.0	2.5	15.0	12.5	13.5	18.0	13.0	15.5
22	.5	.0	.0	4.0	1.5	2.5	14.5	11.5	13.0	17.5	15.0	16.5
23	.5	.0	.0	3.5	1.0	2.0	13.0	10.0	11.5	17.5	15.0	16.0
24	.5	.0	.0	1.5	.0	.5	12.5	9.5	11.0	18.0	15.5	16.5
25	.5	.0	.0	1.5	.0	1.0	14.5	10.5	12.0	17.5	14.5	16.0
26	.5	.0	.0	4.5	.0	2.0	13.5	12.0	12.5	17.0	13.5	15.5
27	.5	.0	.0	5.5	1.5	3.5	14.0	11.5	12.5	18.0	14.0	16.0
28	.0	.0	.0	4.0	1.5	2.5	16.0	11.5	14.0	16.0	14.5	15.0
29	---	---	---	4.0	1.5	2.5	17.0	13.5	15.0	14.5	13.0	13.5
30	---	---	---	3.0	2.0	2.5	14.0	10.0	12.0	18.0	12.5	15.0
31	---	---	---	5.5	1.5	3.0	---	---	---	21.5	15.5	18.5
MONTH	1.0	.0	.0	5.5	.0	1.0	17.0	.0	8.8	21.5	8.0	14.0

UPPER MISSISSIPPI RIVER BASIN

05288705 SHINGLE CREEK AT QUEEN AVE IN MINNEAPOLIS, MN.--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	23.0	18.5	21.0	27.0	21.5	25.0	24.5	20.0	22.0	24.5	22.5	23.0
2	23.5	20.0	21.5	22.0	20.0	20.5	26.0	21.0	23.5	22.5	20.5	21.5
3	23.5	20.0	21.5	20.0	18.0	18.5	26.5	22.0	24.0	20.5	18.5	19.5
4	24.0	20.0	22.0	20.5	16.5	18.5	25.5	22.0	24.0	20.0	17.5	18.5
5	24.0	20.0	22.0	20.5	18.0	19.5	24.0	20.5	22.5	21.0	17.5	19.5
6	23.5	20.5	22.0	21.0	18.0	19.5	24.0	20.0	22.0	22.0	19.0	20.5
7	22.5	19.0	21.5	---	---	---	24.0	21.0	22.5	21.0	19.0	20.0
8	23.5	19.0	21.0	---	---	---	24.0	21.5	23.0	20.5	19.0	19.5
9	24.5	19.0	22.0	---	---	---	22.5	20.0	21.5	20.0	18.0	19.5
10	25.0	20.5	22.5	---	---	---	21.0	18.5	19.5	19.5	17.0	18.5
11	24.5	20.5	22.0	23.5	19.0	21.5	21.0	17.5	19.0	19.0	17.0	18.5
12	25.0	19.5	22.0	24.5	22.0	23.0	21.0	18.5	19.5	19.5	18.0	18.5
13	25.0	20.0	22.5	27.0	22.5	24.5	21.0	17.0	19.0	19.0	18.0	18.5
14	24.5	18.0	21.5	26.5	22.0	24.0	19.5	17.0	18.0	20.0	17.0	18.5
15	23.0	19.5	21.0	27.5	21.5	24.0	21.0	16.5	19.0	20.0	19.0	19.5
16	22.5	18.0	20.0	28.0	24.0	26.0	23.5	19.0	21.0	19.5	18.5	19.0
17	20.0	17.0	18.5	28.0	24.5	26.5	21.5	18.0	19.0	19.5	17.0	18.5
18	19.5	18.0	18.5	28.0	25.0	26.5	18.5	16.5	17.5	21.5	17.5	19.0
19	20.5	17.5	19.0	25.5	22.0	23.5	18.0	16.0	17.0	21.5	18.5	20.0
20	23.0	19.0	20.5	25.5	21.0	23.0	19.0	16.0	17.5	18.5	15.5	16.5
21	25.0	20.0	22.5	24.5	21.5	23.5	20.5	16.5	18.0	16.5	14.5	15.5
22	25.0	20.5	22.5	22.0	18.5	20.0	21.5	17.0	19.0	15.5	14.5	15.0
23	28.0	21.5	24.5	22.5	19.0	20.5	21.5	17.5	19.5	16.0	13.5	14.5
24	25.5	22.5	24.0	22.0	20.0	21.0	22.5	19.0	20.5	16.0	13.5	15.0
25	25.5	23.0	24.0	25.0	20.5	22.0	22.0	19.0	21.0	18.0	15.0	16.5
26	26.5	21.5	23.5	26.5	22.0	24.0	23.0	21.0	22.0	18.0	15.5	17.0
27	27.5	21.5	24.0	27.0	23.5	25.0	24.0	22.5	23.0	19.0	17.0	17.5
28	24.5	21.5	23.0	26.5	22.5	24.5	23.5	22.0	22.5	19.0	16.5	17.5
29	22.5	20.0	20.5	25.5	22.0	23.5	22.0	21.0	21.5	16.5	14.5	15.5
30	24.5	20.0	22.0	25.0	20.5	23.0	22.5	20.0	21.5	15.5	13.0	14.5
31	---	---	---	23.5	20.5	21.5	24.0	22.0	22.5	---	---	---
MONTH	28.0	17.0	21.8	---	---	---	26.5	16.0	20.7	24.5	13.0	18.2

UPPER MISSISSIPPI RIVER BASIN

05288705 SHINGLE CREEK AT QUEEN AVE IN MINNEAPOLIS, MN.--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	799	708	764	585	490	532	2650	1780	2210	1280	1250	1260
2	930	754	824	656	585	624	2190	1730	1980	2060	1280	1460
3	1000	814	931	687	608	645	1730	1500	1600	2410	1620	1880
4	---	---	---	653	406	600	1510	1410	1470	3150	2060	2430
5	---	---	---	637	550	588	1500	1380	1420	2930	2280	2590
6	---	---	---	646	600	624	1630	1390	1500	2750	2230	2550
7	---	---	---	639	602	615	1980	1480	1780	2230	1990	2100
8	---	---	---	682	639	656	2250	1570	1900	2000	1800	1910
9	---	---	---	724	682	700	1940	1500	1680	1810	1720	1770
10	---	---	---	753	724	733	1500	1380	1430	1720	1680	1700
11	---	---	---	817	753	781	2070	1380	1600	1690	1640	1650
12	---	---	---	889	817	847	2140	1710	1900	1640	1590	1620
13	---	---	---	984	476	824	2540	1690	2000	1590	1550	1570
14	---	---	---	874	462	508	2460	2140	2250	1550	1500	1520
15	978	499	618	1830	451	625	2210	1870	2020	1520	1480	1500
16	---	---	---	1570	314	664	1890	1660	1770	1520	1440	1480
17	---	---	---	473	396	453	1660	1580	1600	1440	1390	1410
18	426	370	397	476	424	455	1600	1530	1550	1470	1440	1460
19	513	426	494	453	419	432	1610	1510	1560	1770	1430	1490
20	581	509	553	484	453	466	1510	1410	1450	1880	1710	1780
21	617	581	597	613	482	540	1460	1400	1420	3010	1600	1910
22	661	556	637	767	596	697	1460	1370	1430	3010	1980	2500
23	556	222	375	797	735	756	1410	1300	1330	2990	1910	2390
24	534	361	413	939	764	812	1560	1330	1450	2860	2180	2420
25	460	389	427	1010	881	913	1330	1300	1310	2390	1970	2170
26	492	460	477	1120	914	1050	1330	1310	1330	1990	1720	1830
27	552	492	526	987	948	969	1330	1310	1320	1980	1720	1870
28	617	552	588	956	940	947	1310	1300	1310	1960	1720	1830
29	634	279	490	1770	943	1080	1320	1290	1300	1780	1610	1700
30	396	292	339	2660	1190	1780	1290	1270	1280	1670	1490	1580
31	490	396	450	---	---	---	1300	1270	1280	4220	1480	2160
MONTH	---	---	---	2660	314	731	2650	1270	1590	4220	1250	1850

UPPER MISSISSIPPI RIVER BASIN

05288705 SHINGLE CREEK AT QUEEN AVE IN MINNEAPOLIS, MN.--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	4000	2010	2560	1520	1370	1440	694	663	675	1040	985	1020
2	2520	1620	1910	1460	1260	1360	713	693	704	1040	749	998
3	2930	2090	2560	1380	1200	1310	705	688	696	1020	862	957
4	2680	1950	2240	1440	978	1160	728	696	710	941	887	921
5	2030	1860	1920	1370	1220	1280	737	668	722	1020	931	974
6	2460	1860	2030	1220	983	1120	717	665	703	1060	986	1030
7	2310	1890	2030	2250	1170	2080	743	716	729	1070	723	1010
8	2040	1630	1790	2200	2010	2120	783	743	756	1080	925	1030
9	1930	1700	1780	2010	1670	1820	853	783	824	1080	1030	1040
10	2090	1900	2020	1740	1320	1590	874	848	861	1050	1040	1040
11	2060	1920	1990	1530	1290	1430	874	783	867	1080	1050	1060
12	2020	1900	1970	1360	1240	1300	910	872	893	1100	1080	1080
13	1990	1880	1940	1430	1260	1310	931	906	915	1120	1100	1110
14	1970	1570	1730	1610	1430	1530	930	920	924	1110	984	1060
15	1740	1590	1670	2180	1580	1870	930	883	924	1110	1090	1100
16	1730	1610	1670	2510	1670	1960	939	922	930	1100	982	1090
17	3360	1620	1960	2480	1810	2150	939	911	923	1110	1100	1100
18	3180	2400	2880	2200	1700	1850	924	797	916	1100	732	967
19	2920	2450	2690	2160	1620	1770	966	922	947	882	799	820
20	2700	2400	2540	1620	1320	1470	974	965	970	923	835	882
21	2700	2070	2330	1390	1120	1250	976	970	974	989	923	962
22	2110	1880	1980	1180	932	1060	1010	975	990	1040	988	1010
23	1970	1760	1860	1050	955	1020	1030	868	968	1050	973	1030
24	1850	1730	1800	1040	1010	1020	1050	980	1030	1060	1010	1040
25	1930	1690	1790	1120	1010	1060	1060	1040	1050	1070	1050	1060
26	2070	1760	1880	1180	940	1070	1050	1030	1040	1090	1070	1080
27	2020	1740	1890	974	832	909	1040	1030	1030	1100	1080	1090
28	1740	1520	1620	870	733	788	1040	1030	1040	1120	1100	1110
29	---	---	---	733	651	685	1040	948	1030	1120	831	997
30	---	---	---	664	652	660	1030	858	976	1070	974	1040
31	---	---	---	672	660	667	---	---	---	1040	947	993
MONTH	4000	1520	2040	2510	651	1360	1060	663	891	1120	723	1020

UPPER MISSISSIPPI RIVER BASIN

05288705 SHINGLE CREEK AT QUEEN AVE IN MINNEAPOLIS, MN.--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	1030	1010	1020	717	130	585	604	562	580	774	719	755
2	1050	1030	1040	394	204	335	640	589	608	811	752	783
3	1500	1010	1080	433	392	415	642	573	617	816	779	799
4	1520	1080	1100	465	428	445	676	589	647	813	800	805
5	1290	748	1040	516	462	488	717	495	665	853	775	817
6	1370	978	1110	573	513	543	730	586	672	891	851	872
7	1450	305	1080	---	---	---	758	684	714	904	876	891
8	1070	1030	1050	---	---	---	853	748	790	921	285	870
9	1060	1000	1030	---	---	---	897	841	870	754	444	530
10	1120	1060	1100	---	---	---	945	882	911	536	449	483
11	1120	1100	1100	635	92	484	974	928	954	646	536	587
12	1120	1090	1100	622	481	589	1030	906	992	743	646	694
13	1130	853	1100	635	125	492	1040	994	1010	823	743	785
14	1140	1090	1110	456	252	382	1060	897	1010	885	823	853
15	1130	532	1030	516	431	474	1070	839	1020	937	884	911
16	1120	919	1060	598	503	549	1080	1020	1050	936	134	655
17	1120	1080	1100	667	543	610	1080	1010	1040	610	469	505
18	1240	1020	1050	698	622	679	1070	1020	1050	576	475	523
19	1060	1000	1030	735	413	640	1120	422	701	628	576	599
20	1230	1000	1100	678	511	591	451	388	412	697	628	660
21	1250	1190	1230	659	484	584	467	421	443	777	697	731
22	1220	1180	1200	665	150	278	520	456	481	838	777	810
23	1240	1170	1200	320	264	299	629	513	551	901	825	871
24	1270	434	1050	349	306	328	652	614	631	948	901	924
25	1160	1020	1110	368	280	346	693	642	667	1010	945	983
26	1150	1080	1130	422	360	390	732	666	713	1010	880	984
27	1080	968	1040	450	414	431	776	732	753	1020	544	979
28	1050	415	819	496	445	467	815	772	799	941	544	854
29	831	412	582	509	478	495	843	752	826	941	798	865
30	601	530	556	565	497	534	849	215	572	830	779	801
31	---	---	---	591	545	561	719	658	677	---	---	---
MONTH	1520	305	1040	---	---	---	1120	215	756	1020	134	773

UPPER MISSISSIPPI RIVER BASIN

05288705 SHINGLE CREEK AT QUEEN AVE IN MINNEAPOLIS, MN.--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, (PER- CENT SATUR- ATION) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT										
11...	1015	0.13	1060	1070	7.6	7.7	7.5	742	6.5	56
NOV										
05...	0930	16	581	--	7.2	--	4.5	743	8.4	66
12...	1120	3.3	854	873	7.3	7.8	0.5	756	9.9	70
DEC										
16...	1030	9.4	1780	1830	7.3	7.5	0.0	737	7.6	56
JAN										
22...	1010	6.9	2640	2670	7.0	7.6	0.0	733	5.2	37
FEB										
06...	1000	5.3	1990	2000	7.1	7.7	0.0	750	7.0	49
27...	1010	6.4	1930	1950	7.2	7.5	0.5	740	6.5	46
MAR										
10...	0900	10	1660	1670	7.2	7.5	0.5	--	8.4	61
20...	1244	13	1550	1600	7.3	7.5	3.0	741	9.8	75
26...	1140	37	1200	1200	7.4	7.4	2.0	742	9.5	71
APR										
10...	1040	36	873	879	7.5	7.6	3.5	750	11.4	87
17...	0943	20	929	944	7.9	7.8	6.5	749	12.4	102
25...	1045	13	1050	1050	7.8	7.8	12.0	745	10.6	100
MAY										
01...	1045	15	994	999	7.7	7.7	9.0	738	9.4	84
09...	1055	17	1040	1040	7.7	7.8	11.0	745	9.4	87
13...	0912	9.8	1100	1110	7.9	7.9	8.5	738	11.3	100
19...	1000	20	809	813	7.6	7.5	14.5	742	5.8	58
27...	1030	7.4	1090	1060	7.8	7.9	14.5	750	8.7	87
29...	0955	16	884	857	7.5	7.7	13.5	741	6.7	66
JUN										
06...	1202	10	1030	1010	7.7	7.6	22.5	742	6.8	81
13...	1320	3.8	1100	1070	7.8	7.8	24.5	740	7.1	87
15...	1648	11	849	798	7.7	7.4	22.5	--	6.9	82
24...	1410	34	450	850	7.4	7.5	24.0	--	5.2	63
JUL										
01...	2100	218	52	102	7.9	7.2	21.0	730	6.2	73
07...	1552	55	--	595	--	7.5	--	--	--	--
07...	1621	69	417	--	7.3	--	18.0	739	5.8	63
10...	0940	27	584	556	7.4	7.7	19.0	745	5.0	55
11...	1016	133	246	196	7.4	7.6	20.0	744	6.5	73
15...	1000	43	471	450	7.3	7.6	23.0	741	3.5	43
19...	1024	47	--	--	--	--	--	--	--	--
19...	1035	48	453	610	7.0	7.5	23.5	739	5.4	65
22...	0930	115	304	292	7.4	7.5	19.5	739	6.3	71
30...	0930	67	565	546	7.3	7.7	21.5	750	3.1	36
31...	0815	56	550	--	--	--	21.0	--	--	--
AUG										
08...	1140	22	780	781	7.2	7.7	22.5	738	5.3	64
14...	0910	11	1030	1010	7.5	7.8	18.0	738	5.2	56
18...	1020	8.0	1050	1020	7.6	7.8	17.5	748	5.3	57
25...	1020	31	652	621	7.4	7.9	19.5	744	4.7	52
SEP										
09...	1110	37	567	536	7.3	7.6	18.0	738	5.9	64
29...	1135	10	882	816	7.6	7.9	15.5	727	6.7	71

UPPER MISSISSIPPI RIVER BASIN

05288705 SHINGLE CREEK AT QUEEN AVE IN MINNEAPOLIS, MN.--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	COLI-FORM, FECAL, 0.7 UM-MF (COLS/ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
OCT											
11...	--	--	310	254	262	310	0.080	0.020	0.40	0.50	0.110
NOV											
05...	--	--	--	118	--	144	--	--	--	--	--
12...	--	--	310	194	208	237	0.270	0.040	0.70	0.70	0.360
DEC											
16...	--	--	370	238	234	290	0.400	0.030	0.80	0.80	0.520
JAN											
22...	--	--	390	239	243	292	0.540	0.040	1.0	1.2	0.410
FEB											
06...	--	--	470	278	281	339	0.470	0.020	0.90	1.0	0.500
27...	--	--	390	254	244	310	0.530	0.020	0.80	1.0	0.470
MAR											
10...	--	--	340	197	205	240	0.540	0.020	0.90	1.1	0.480
20...	--	--	280	180	188	220	0.460	0.020	0.80	1.1	0.560
26...	--	--	210	139	145	170	0.360	0.030	0.70	1.0	0.850
APR											
10...	--	--	260	162	171	198	0.110	0.020	0.60	0.90	0.850
17...	--	--	300	188	202	229	<0.015	0.010	0.40	0.70	0.480
25...	--	--	360	224	231	273	0.018	0.010	0.37	0.77	0.320
MAY											
01...	--	--	340	208	219	254	0.034	0.025	0.55	0.82	0.663
09...	--	--	350	216	222	264	0.058	0.022	0.54	0.80	0.559
13...	--	--	400	238	246	290	<0.015	0.012	0.23	0.79	0.397
19...	--	--	260	148	171	181	0.243	0.031	0.56	1.0	0.486
27...	--	--	420	235	246	287	0.026	0.022	0.47	0.72	0.223
29...	--	--	300	181	190	221	0.164	0.030	0.57	1.0	0.532
JUN											
06...	--	--	370	208	217	254	0.038	0.025	0.67	1.1	0.172
13...	--	--	370	189	196	231	0.110	0.023	0.59	0.93	0.141
15...	--	--	260	142	144	173	0.266	0.048	0.89	1.7	0.390
24...	--	--	300	181	183	221	0.239	0.024	0.83	2.2	0.238
JUL											
01...	--	--	25	18	40	22	0.226	0.014	0.43	2.0	0.214
07...	--	--	200	146	144	175	0.206	0.030	0.74	1.3	0.235
07...	--	--	--	--	--	--	0.301	0.032	0.82	1.5	0.327
10...	--	--	170	136	134	166	0.170	0.033	0.73	1.1	0.151
11...	--	--	55	44	49	54	0.098	0.018	0.40	1.2	0.257
15...	--	--	160	109	120	133	0.093	0.028	0.68	0.97	0.190
19...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	210	148	147	181	0.349	0.045	1.3	2.0	0.457
22...	--	--	87	62	68	76	0.141	0.026	0.49	1.2	0.206
30...	--	--	180	126	143	154	0.098	0.013	0.89	1.0	0.107
31...	--	--	--	145	--	177	0.116	0.011	0.76	1.1	0.126
AUG											
08...	--	--	280	246	191	300	0.118	0.033	0.64	1.1	0.271
14...	--	--	380	232	239	283	0.131	0.039	0.69	0.87	0.350
18...	--	--	390	220	241	268	0.137	0.040	0.55	0.79	0.409
25...	--	--	220	142	160	173	0.093	0.021	0.50	0.88	0.225
SEP											
09...	--	--	190	115	120	140	0.105	0.026	0.44	0.79	0.362
29...	500	3600	330	--	209	--	0.060	0.027	0.39	0.64	0.416

UPPER MISSISSIPPI RIVER BASIN

05288705 SHINGLE CREEK AT QUEEN AVE IN MINNEAPOLIS, MN.--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)
OCT										
11...	0.060	0.020	0.020	5.4	0.70	85	23	82	2	4.7
NOV										
05...	--	--	--	--	--	--	--	--	--	--
12...	0.060	0.020	0.010	6.5	0.70	87	23	47	1	3.8
DEC										
16...	0.100	0.030	0.010	5.7	0.80	100	28	210	5	6.8
JAN										
22...	0.050	<0.010	<0.010	6.6	0.70	110	29	350	8	5.7
FEB										
06...	<0.010	<0.010	<0.010	4.6	0.30	130	35	220	4	6.0
27...	0.040	<0.010	0.020	5.3	0.90	110	30	229	5	7.5
MAR										
10...	0.050	<0.010	0.020	5.6	0.80	95	25	190	4	5.2
20...	0.090	<0.010	<0.010	5.9	1.6	76	21	180	5	4.9
26...	0.120	<0.010	<0.010	6.4	0.90	60	15	140	4	4.4
APR										
10...	0.060	<0.010	<0.010	7.0	0.20	74	19	68	2	3.9
17...	0.070	<0.010	<0.010	6.2	1.3	83	24	62	2	4.0
25...	0.091	0.013	<0.010	6.0	1.0	97	28	66	2	3.8
MAY										
01...	0.036	<0.010	<0.010	7.9	0.60	93	27	65	2	4.1
09...	0.046	<0.010	<0.010	6.8	0.70	95	27	66	2	4.0
13...	0.058	<0.010	<0.010	6.3	0.70	110	31	72	2	3.7
19...	0.074	<0.010	<0.010	6.0	1.2	72	19	53	1	3.2
27...	0.052	<0.010	<0.010	6.8	0.90	110	32	63	1	3.9
29...	0.078	<0.010	<0.010	7.0	0.60	82	24	46	1	3.1
JUN										
06...	0.069	<0.010	<0.010	7.3	1.2	97	30	60	1	3.9
13...	0.070	0.014	0.014	7.2	1.3	91	34	70	2	4.0
15...	0.175	0.023	<0.010	10	1.9	66	24	53	1	3.6
24...	0.309	0.036	0.029	7.8	>5.0	77	25	56	1	3.8
JUL										
01...	0.381	0.030	0.027	2.4	>4.0	7.6	1.4	4.5	0.4	1.1
07...	0.181	0.042	0.032	14	1.7	56	14	43	1	3.3
07...	0.202	0.014	0.021	--	--	--	--	--	--	--
10...	0.125	0.014	0.021	8.1	1.8	49	13	39	1	2.6
11...	0.155	0.022	0.024	4.2	1.7	16	3.7	12	0.7	1.2
15...	0.230	<0.010	<0.010	8.7	2.7	46	11	28	1	2.4
19...	--	--	--	7.7	>5.0	--	--	--	--	--
19...	0.254	0.027	0.032	--	--	57	15	39	1	2.8
22...	0.174	0.020	0.027	4.9	3.1	25	5.8	20	0.9	1.5
30...	0.152	0.038	0.044	9.0	0.50	47	14	40	1	3.6
31...	0.130	0.038	0.029	8.8	0.50	--	--	--	--	--
AUG										
08...	0.099	<0.010	0.015	7.8	<0.20	75	21	51	1	3.5
14...	0.060	0.026	<0.010	6.3	1.1	110	28	59	1	3.8
18...	0.058	<0.010	0.015	6.6	1.3	110	30	64	1	4.1
25...	0.075	0.011	0.020	6.9	1.0	62	16	38	1	2.8
SEP										
09...	0.079	<0.010	0.011	4.8	1.5	52	14	34	1	2.9
29...	0.056	<0.010	<0.010	5.5	0.60	91	25	50	1	3.9

UPPER MISSISSIPPI RIVER BASIN

05288705 SHINGLE CREEK AT QUEEN AVE IN MINNEAPOLIS, MN.--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
11...	160	37	0.20	19	110	280	638	564	77	24
NOV										
05...	--	--	--	--	--	--	--	--	13	90
12...	110	91	0.20	15	21	300	542	496	--	--
DEC										
16...	370	99	0.20	16	25	680	1030	976	95	61
JAN										
22...	640	100	0.10	17	26	610	1480	1400	93	37
FEB										
06...	400	120	0.20	20	21	660	1140	1100	109	17
27...	420	110	0.18	17	17	964	1120	1080	101	26
MAR										
10...	410	89	0.10	14	11	790	932	950	46	60
20...	340	69	0.20	12	15	540	868	815	36	81
26...	250	46	0.10	9.5	43	300	671	613	22	92
APR										
10...	130	69	0.13	10	48	260	500	480	36	63
17...	130	83	0.17	9.5	40	347	618	512	33	79
25...	140	100	0.21	8.9	39	523	626	588	70	80
MAY										
01...	130	93	0.16	8.7	37	480	604	553	38	70
09...	140	95	0.15	9.0	48	506	641	572	39	76
13...	160	100	0.18	9.7	33	453	654	632	36	53
19...	120	61	0.18	7.0	47	337	479	427	16	92
27...	140	110	0.27	11	84	530	642	613	42	46
29...	110	93	0.18	8.4	31	467	509	477	12	98
JUN										
06...	130	110	0.20	10	64	515	630	570	20	75
13...	160	120	0.20	15	110	754	656	603	294	96
15...	110	79	0.19	12	55	485	542	436	22	98
24...	120	69	0.15	14	53	522	551	475	187	86
JUL										
01...	7.8	3.8	<0.10	1.2	93	53	56	40	183	92
07...	79	34	0.15	12	100	410	364	331	37	95
07...	--	--	--	--	--	--	--	--	--	--
10...	77	33	0.14	10	110	343	368	307	18	95
11...	21	10	<0.10	3.1	41	135	114	95	67	91
15...	51	27	0.11	10	120	414	306	242	57	93
19...	--	--	--	--	--	--	--	--	--	--
19...	75	39	0.14	12	68	551	397	333	57	97
22...	36	15	<0.10	4.9	57	207	178	148	51	91
30...	76	19	0.13	12	71	541	355	288	20	94
31...	--	--	--	--	--	--	--	--	20	88
AUG										
08...	98	53	0.15	14	28	686	494	466	14	99
14...	130	88	0.18	16	30	747	667	574	20	89
18...	140	94	0.18	16	44	734	646	587	26	89
25...	79	42	0.13	11	34	378	439	338	12	96
SEP										
09...	73	41	0.10	8.3	23	306	328	297	20	89
29...	120	77	0.15	15	23	413	577	506	18	88

MINNESOTA RIVER BASIN

05290000 LITTLE MINNESOTA RIVER NEAR PEEVER, SD

LOCATION.--Lat 45°36'05", long 96°52'18", in SW¹/₄ sec. 13, T.125 N., R.50 W., Roberts County, Hydrologic Unit 07020001, on Sisseton Indian Reservation, on right bank 2 mi northwest of town of Browns Valley, MN, 5.3 mi northeast of Peever, 7.2 mi downstream from Jorgenson River, and 8 mi upstream from Big Stone Lake.

DRAINAGE AREA.--447 mi².

PERIOD OF RECORD.--October 1939 to September 1981, October 1989 to current year.

REVISED RECORDS.--WSP 1308: 1943(M).

GAGE.--Water-stage recorder. Datum of gage is 1,002.20 ft above sea level. Oct. 1, 1939 to Mar. 20, 1940, nonrecording gage at site 4.5 mi downstream at different datum. Mar. 21 to Apr. 12, 1940, nonrecording gage at site 100 ft downstream at present datum. April 13 to Aug. 27, 1940, nonrecording gage at present site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 450 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 27	1500	(ice jam)	*14.40	Apr. 06	1030	3270	8.90
Mar. 28	0530	*3590	8.82	Apr. 15	0830	1370	6.50
Apr. 02	1730	2760	8.82				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.1	69	e9.6	e3.5	e3.1	e4.2	1960	378	94	17	31	3.9
2	4.3	55	e9.5	e3.5	e3.1	e4.3	2470	352	90	20	30	3.4
3	3.7	43	e9.5	e3.5	e3.1	e4.4	2410	352	86	19	27	3.1
4	3.3	35	e9.5	e3.4	e3.2	e4.4	2030	342	83	20	24	3.1
5	3.3	32	e9.5	e3.4	e3.2	e4.4	2320	310	79	17	22	3.0
6	3.2	31	e9.6	e3.4	e3.2	e4.5	2700	291	72	15	24	2.7
7	3.0	31	e9.6	e3.4	e3.3	e4.6	1120	272	65	14	19	2.6
8	3.4	29	e9.7	e3.3	e3.3	e4.6	1070	273	59	14	16	2.5
9	4.3	27	e9.8	e3.3	e3.3	e4.6	1090	272	53	16	14	2.4
10	4.1	20	e9.9	e3.3	e3.3	e4.7	1060	256	47	15	11	2.3
11	4.3	18	e9.9	e3.3	e3.4	e4.7	935	241	42	14	8.7	2.2
12	4.8	e17	e9.9	e3.2	e3.4	e4.8	894	223	38	12	7.3	2.2
13	4.8	e16	e9.9	e3.2	e3.5	e4.8	955	202	34	11	6.2	2.0
14	4.8	15	e9.9	e3.1	e3.5	e4.9	1150	188	30	11	7.6	2.2
15	4.9	16	e9.9	e3.1	e3.5	e5.0	1340	175	28	9.7	8.5	3.1
16	4.8	15	e9.2	e3.1	e3.6	e5.1	1210	161	26	9.5	8.9	3.1
17	9.1	14	e8.2	e3.1	e3.6	e5.2	1010	150	26	8.8	9.4	2.9
18	18	14	e7.2	e3.1	e3.7	e5.2	930	142	22	8.7	8.2	3.0
19	25	e14	e6.2	e3.1	e3.7	e5.3	959	135	19	8.7	9.4	3.0
20	21	e13	e5.6	e3.1	e3.7	e6.0	913	125	19	11	9.6	2.7
21	16	e13	e5.1	e3.1	e3.8	e4.0	851	113	18	13	11	2.2
22	14	e12	e4.8	e3.1	e3.8	e200	801	104	18	19	11	2.2
23	13	e11	e4.5	e3.1	e3.8	e450	740	101	18	16	9.2	2.2
24	12	e11	e4.2	e3.1	e3.9	e800	671	111	20	13	7.6	2.1
25	11	e11	e4.1	e3.1	e4.0	e1200	607	130	18	14	6.5	2.0
26	12	e10	e3.8	e3.1	e4.1	e2000	548	127	15	13	5.7	1.9
27	13	e10	e3.7	e3.1	e4.2	e3300	505	118	15	13	5.1	1.9
28	15	e10	e3.6	e3.1	e4.2	3420	474	114	14	11	4.5	1.8
29	18	e9.8	e3.6	e3.1	---	2850	440	108	13	20	4.2	1.4
30	40	e9.6	e3.6	e3.1	---	2420	415	103	14	30	4.3	1.4
31	74	---	e3.5	e3.1	---	1930	---	99	---	31	3.9	---
TOTAL	377.2	631.4	226.6	99.5	99.5	18705.7	34578	6068	1175	464.4	374.8	74.5
MEAN	12.2	21.0	7.31	3.21	3.55	603	1153	196	39.2	15.0	12.1	2.48
MAX	74	69	9.9	3.5	4.2	3420	2700	378	94	31	31	3.9
MIN	3.0	9.6	3.5	3.1	3.1	4.2	415	99	13	8.7	3.9	1.4
AC-FT	748	1250	449	197	197	37100	68590	12040	2330	921	743	148
CFSM	.03	.05	.02	.01	.01	1.35	2.58	.44	.09	.03	.03	.01
IN.	.03	.05	.02	.01	.01	1.56	2.88	.50	.10	.04	.03	.01

e Estimated

MINNESOTA RIVER BASIN

05290000 LITTLE MINNESOTA RIVER NEAR PEEVER, SD--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 1997, BY WATER YEAR (WY)

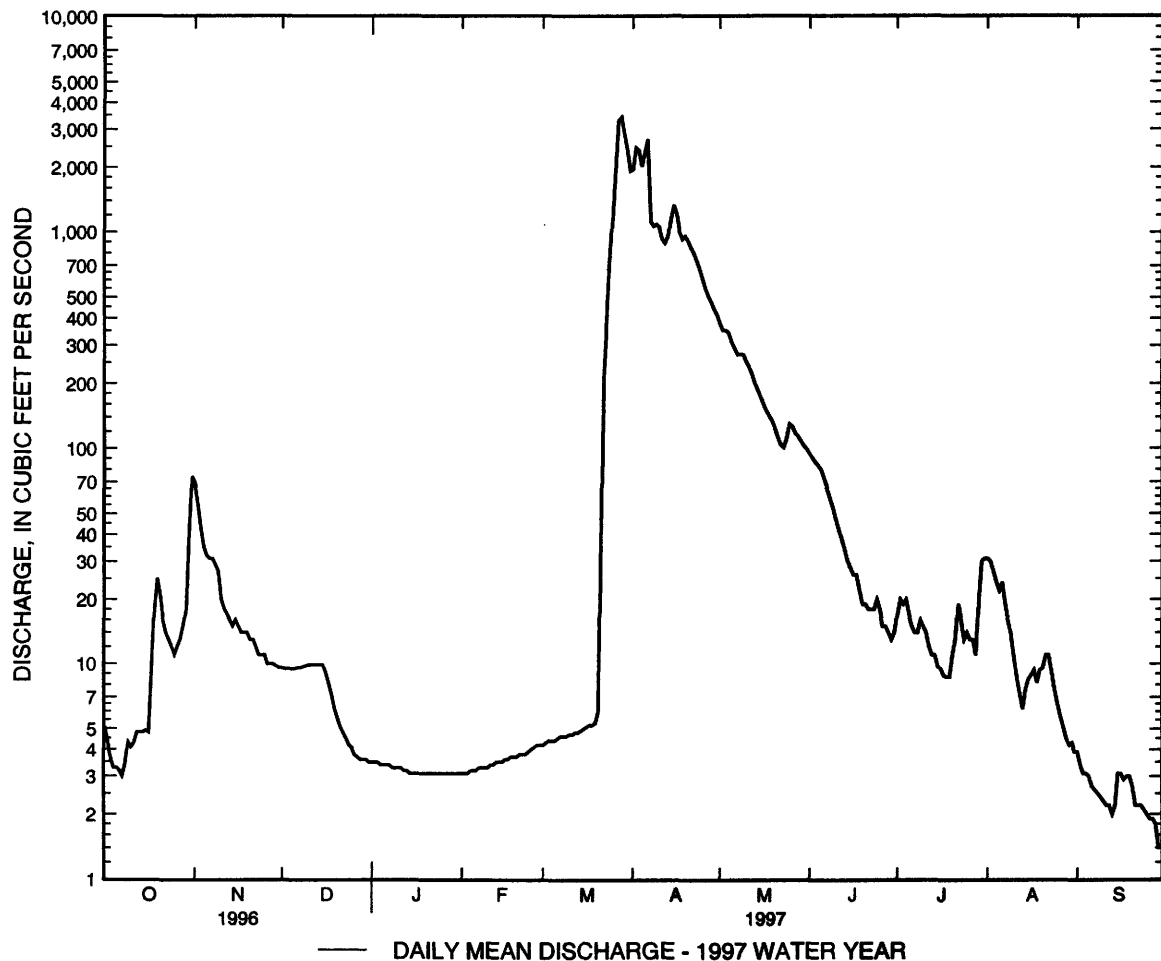
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	5.57	5.78	3.01	1.51	2.69	118	225	96.6	74.3	55.0	13.0	4.42
MAX	73.9	36.6	18.2	11.4	21.8	603	1321	531	355	865	235	43.3
(WY)	1996	1996	1994	1994	1976	1997	1952	1962	1942	1993	1993	1993
MIN	.21	.25	.10	.000	.000	.51	2.89	2.20	.41	.041	.059	.074
(WY)	1940	1940	1940	1940	1940	1956	1981	1981	1976	1976	1976	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1940 - 1997
ANNUAL TOTAL	27443.8	62874.6	
ANNUAL MEAN	75.0	172	50.5 ^a
HIGHEST ANNUAL MEAN		172	1957
LOWEST ANNUAL MEAN		1.37	1981
HIGHEST DAILY MEAN	807	3420	5400
LOWEST DAILY MEAN	1.1	1.4	.00 ^b
ANNUAL SEVEN-DAY MINIMUM	1.2	1.8	.00
INSTANTANEOUS PEAK FLOW		3590	8900
INSTANTANEOUS PEAK STAGE		14.40 ^c	14.40 ^c
INSTANTANEOUS LOW FLOW		1.2	.00
ANNUAL RUNOFF (AC-FT)	54430	124700	36600
ANNUAL RUNOFF (CFSM)	.17	.39	.11
ANNUAL RUNOFF (INCHES)	2.28	5.23	1.54
10 PERCENT EXCEEDS	207	460	111
50 PERCENT EXCEEDS	13	9.9	3.4
90 PERCENT EXCEEDS	3.3	3.1	.30

a Median of annual mean discharges is 36.3 ft³/s.

b Many days, several years.

c Backwater from ice.



MINNESOTA RIVER BASIN

05291000 WHETSTONE RIVER NEAR BIG STONE CITY, SD

LOCATION.--Lat 45°17'32", long 96°29'14", in SE¹/₄NW¹/₄ sec. 18, T.121 N., R.46 W., Grant County, Hydrologic Unit 07020001, on right bank 20 ft downstream from former highway bridge site, 1.5 mi west of Big Stone City, and 4.5 mi upstream from Big Stone Lake.

DRAINAGE AREA.--389 mi².

PERIOD OF RECORD.--March 1910 to November 1912 (no winter records), and March 1931 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 895: Drainage area. WSP 1308: 1932(M), 1935(M).

GAGE.--Water-stage recorder. Datum of gage is 996.96 ft in mean sea level, adjustment of 1912. Mar. 8, 1910 to Nov. 30, 1912, nonrecording gage 2 mi downstream at different datum. Mar. 18, 1931 to May 3, 1939, nonrecording gage, at site 20 ft upstream at present datum. May 4, 1939 to Nov. 8, 1952, water-stage recorder at site 80 ft down-stream at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair to poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known, about 26 ft in June 1919, present site and datum, from information by local resident, discharge 29,000 ft³/s, from dam break.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr 01	1700	6110	12.58	Apr 20	0400	1010	5.79
Apr 06	1500	*7930	*14.21	May 04	0700	463	4.21
Apr 14	0800	1220	6.24				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26	84	e36	e25	e27	e28	5320	314	95	41	32	43
2	23	78	e35	e25	e27	e28	5420	300	93	43	30	49
3	21	73	e34	e25	e26	e28	3650	355	95	46	28	38
4	20	65	e33	e26	e26	e31	2850	445	94	42	26	34
5	21	61	e32	e28	e26	e30	3900	352	91	41	23	30
6	21	59	e32	e27	e26	e30	6600	290	87	39	28	28
7	22	56	e31	e27	e26	e30	3120	264	83	40	28	25
8	20	53	e30	e26	e25	e30	1920	253	76	47	26	24
9	20	51	e29	e26	e25	e30	1430	243	71	43	22	24
10	19	43	e28	e25	e25	e30	1280	226	68	40	23	24
11	21	e44	e28	e25	e25	e31	1000	205	65	40	22	22
12	21	e43	e28	e25	e25	e31	913	186	62	39	21	20
13	22	e40	e28	e25	e26	e32	999	175	60	37	20	19
14	20	e39	e28	e25	e28	e35	1170	167	58	36	31	18
15	18	e38	e29	e25	e28	e33	1130	158	55	35	47	22
16	21	e38	e29	e26	e28	e32	1040	152	53	33	37	24
17	53	e37	e28	e26	e28	e32	841	143	50	47	34	23
18	67	e36	e27	e26	e27	e32	745	139	50	44	33	22
19	63	e36	e27	e26	e26	e33	879	131	49	41	33	22
20	58	e35	e27	e26	e27	e34	940	126	49	47	36	20
21	49	e34	e26	e26	e28	e36	784	122	48	45	36	20
22	43	e33	e26	e28	e28	e39	689	117	45	43	35	19
23	39	e33	e26	e27	e27	e43	636	117	45	44	32	18
24	38	e32	e25	e26	e26	e47	576	117	45	43	29	17
25	36	e32	e25	e26	e26	e52	503	117	41	51	25	18
26	40	e32	e25	e26	e28	e65	449	117	40	59	23	19
27	59	e32	e25	e26	e28	e100	404	112	38	54	22	18
28	56	e33	e24	e26	e28	e3610	392	107	37	47	20	16
29	58	e33	e24	e26	---	e4390	367	104	39	41	20	15
30	102	e34	e24	e27	---	e4690	354	101	39	36	61	16
31	103	---	e24	e28	---	e5180	---	99	---	33	54	---
TOTAL	1200	1337	873	807	746	18872	50301	5854	1821	1317	937	707
MEAN	38.7	44.6	28.2	26.0	26.6	609	1677	189	60.7	42.5	30.2	23.6
MAX	103	84	36	28	28	5180	6600	445	95	59	61	49
MIN	18	32	24	25	25	28	354	99	37	33	20	15
AC-FT	2380	2650	1730	1600	1480	37430	99770	11610	3610	2610	1860	1400
CFSM	.10	.11	.07	.07	.07	1.56	4.31	.49	.16	.11	.08	.06

e Estimated

MINNESOTA RIVER BASIN

05291000 WHETSTONE RIVER NEAR BIG STONE CITY, S.D.--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1910 - 1997, BY WATER YEAR (WY)

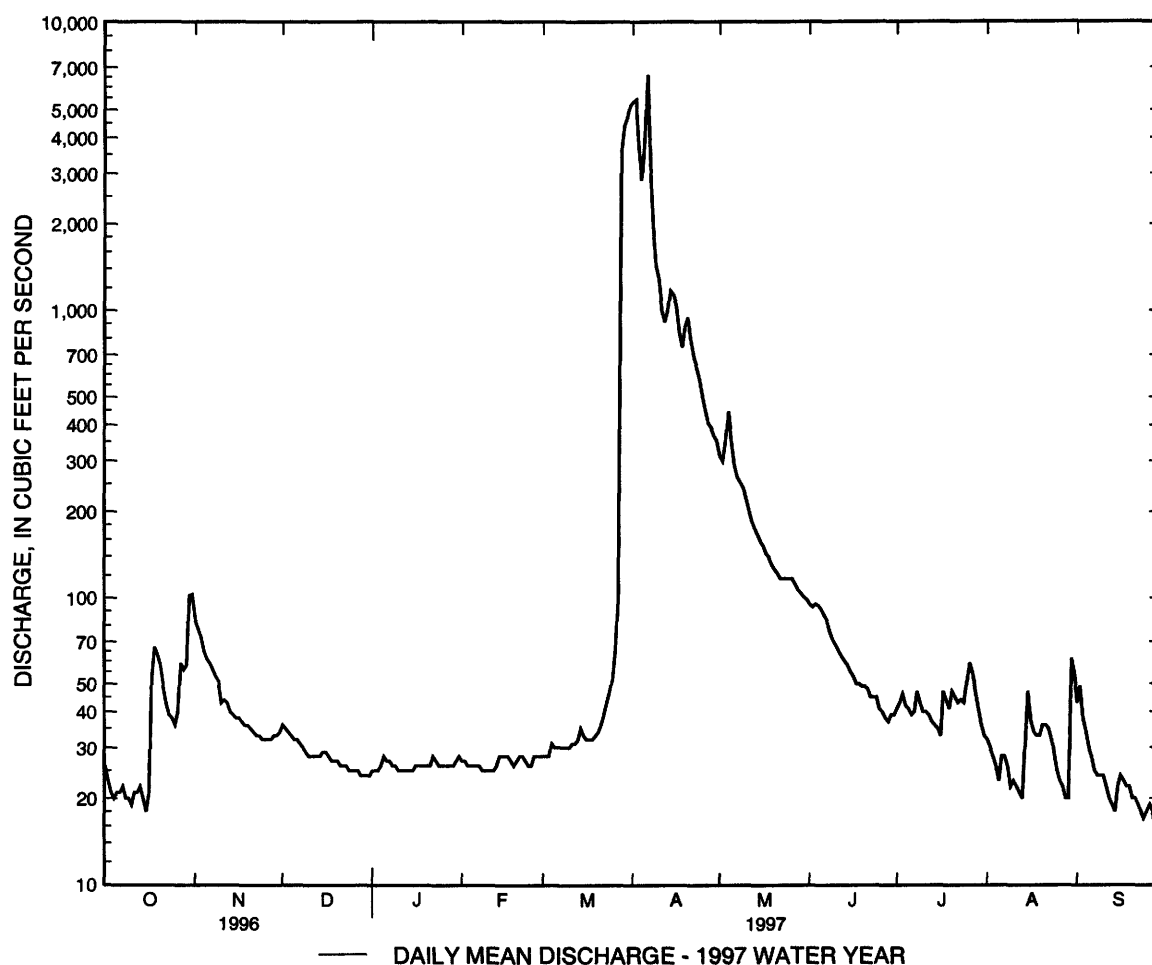
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	14.3	13.5	8.82	6.10	12.3	161	212	91.3	77.5	59.7	20.1	10.5
MAX	280	122	43.3	36.3	118	612	1677	491	478	885	327	77.0
(WY)	1996	1996	1972	1994	1984	1978	1997	1972	1984	1993	1991	1995
MIN	.60	.40	.20	.000	.000	2.85	3.63	.77	1.42	.035	.000	.36
(WY)	1932	1935	1935	1934	1934	1969	1934	1934	1936	1934	1934	1935

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1910 - 1997
ANNUAL TOTAL	34962	84772	
ANNUAL MEAN	95.5	232	59.1 ^a
HIGHEST ANNUAL MEAN			232
LOWEST ANNUAL MEAN			1.52
HIGHEST DAILY MEAN	1150	May 19	6600
LOWEST DAILY MEAN	13	Jan 19	15
ANNUAL SEVEN-DAY MINIMUM	14	Jan 29	17
INSTANTANEOUS PEAK FLOW		7930	Apr 6
INSTANTANEOUS PEAK STAGE		14.21	Apr 6
INSTANTANEOUS LOW FLOW		14	Sep 28
ANNUAL RUNOFF (AC-FT)	69350	168100	42810
ANNUAL RUNOFF (CFSM)	.25	.60	.15
10 PERCENT EXCEEDS	282	353	106
50 PERCENT EXCEEDS	39	34	8.0
90 PERCENT EXCEEDS	17	22	1.4

a Median of annual mean discharges is 41.5 ft³/s.

b Many days, several years.

c Backwater from ice.



MINNESOTA RIVER BASIN

05292000 MINNESOTA RIVER AT ORTONVILLE, MN

LOCATION.--Lat 45°17'44", long 96°26'38", in NE¹/₄NW¹/₄ sec. 16, T.121 N., R.46 W., Big Stone County, Hydrologic Unit 07020001, on left bank 400 ft downstream from bridge on U.S. Highway 12 and 1,300 ft downstream from dam at outlet of Big Stone Lake, at Ortonville.

DRAINAGE AREA.--1,160 mi², approximately.

PERIOD OF RECORD.--February 1938 to current year.

REVISED RECORDS.--WSP 895: 1939. WSP 1508: 1942 (yearly mean).

GAGE.--Water-stage recorder. Datum of gage is 956.38 ft above mean sea level. Prior to Mar. 31, 1939, nonrecording gage on downstream side of dam 1,300 ft upstream at datum 1.31 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are fair to poor. Affected by regulation of Big Stone Lake.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	23	31	e34	43	615	3330	2550	381	85	82	32
2	23	23	31	e34	43	557	3900	2380	320	85	79	46
3	23	23	31	e34	43	483	4200	2210	179	79	71	53
4	22	144	31	e36	43	488	4410	1970	104	75	71	52
5	22	225	31	e45	44	415	4650	2030	104	74	224	50
6	22	163	31	e43	46	373	4750	1490	97	72	186	50
7	21	26	31	e42	46	334	4690	1410	88	69	79	50
8	20	26	31	e40	46	303	4710	1670	85	65	59	50
9	20	26	31	e40	46	283	4840	1250	85	65	57	45
10	20	24	31	e39	46	263	5010	1050	85	65	149	54
11	20	23	31	e37	46	249	4970	1420	85	65	268	60
12	20	24	31	e36	46	236	4820	669	85	65	265	40
13	20	26	31	e36	46	233	4710	311	84	65	222	45
14	20	26	31	e36	46	237	4600	102	84	64	216	50
15	19	26	32	e38	46	209	4480	206	84	62	265	e71
16	19	26	33	e38	46	192	4400	295	84	60	172	e98
17	26	26	35	e38	46	199	4340	298	83	58	131	84
18	18	26	e33	e39	218	187	4260	302	82	56	193	e75
19	16	26	e32	e40	497	173	4230	301	79	55	191	e160
20	15	26	e32	e42	407	171	4130	295	92	54	234	70
21	16	26	e32	e42	365	174	4010	350	107	48	194	38
22	15	26	e33	e42	346	173	3880	411	105	48	157	39
23	15	26	e34	e42	338	169	3710	414	100	48	151	42
24	19	26	e35	e42	332	170	3520	412	96	47	124	50
25	22	27	e34	e42	515	182	3430	402	96	47	96	43
26	22	29	e34	e42	676	181	3320	397	96	39	112	27
27	27	29	e34	e42	654	215	3140	394	91	37	83	e75
28	27	29	e34	e42	629	931	2990	394	89	65	35	e122
29	35	29	e34	e43	---	2450	2990	395	88	84	36	e229
30	32	31	e34	e43	---	2500	2860	396	87	83	41	22
31	23	---	e34	e43	---	2970	---	396	---	82	34	---
TOTAL	662	1236	1003	1232	5745	16315	123280	26570	3325	1966	4277	1922
MEAN	21.4	41.2	32.4	39.7	205	526	4109	857	111	63.4	138	64.1
MAX	35	225	35	45	676	2970	5010	2550	381	85	268	229
MIN	15	23	31	34	43	169	2860	102	79	37	34	22
AC-FT	1310	2450	1990	2440	11400	32360	244500	52700	6600	3900	8480	3810
CFSM	.02	.04	.03	.03	.18	.45	3.54	.74	.10	.05	.12	.06

e Estimated

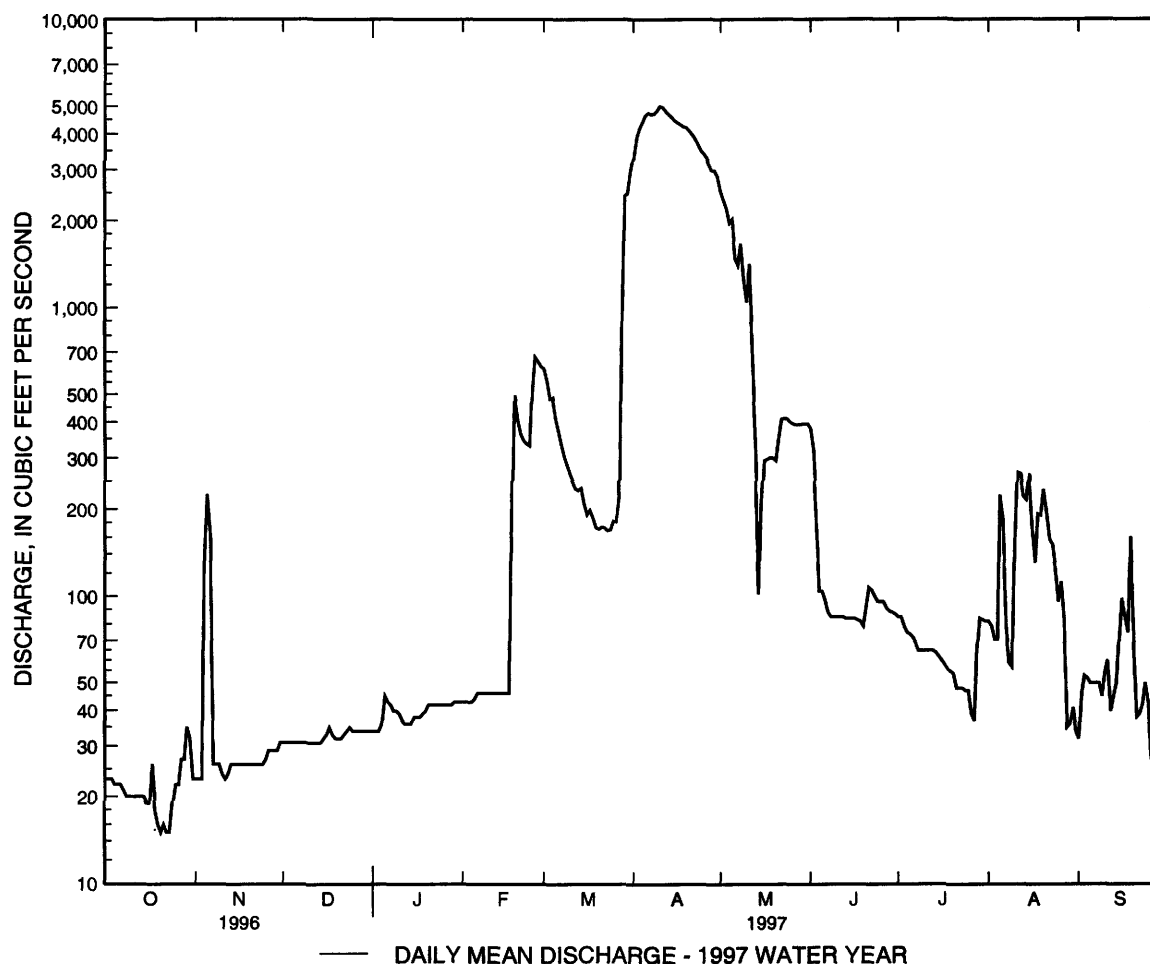
MINNESOTA RIVER BASIN

05292000 MINNESOTA RIVER AT ORTONVILLE, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	30.5	20.7	19.4	20.3	29.4	201	501	267	185	160	78.5	35.4
MAX	441	269	194	164	213	1519	4109	887	1034	1781	1299	250
(WY)	1996	1996	1943	1943	1996	1994	1997	1986	1962	1993	1993	1942
MIN	.20	.20	.20	.17	.16	1.14	1.27	.91	1.30	1.11	.25	.18
(WY)	1939	1939	1939	1940	1940	1941	1941	1941	1977	1977	1959	1988

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1938 - 1997	
ANNUAL TOTAL	93451		187533		131 ^a	
ANNUAL MEAN	255		514		514	
HIGHEST ANNUAL MEAN					2.39	
LOWEST ANNUAL MEAN					.00	
HIGHEST DAILY MEAN	2150		5010		5010	
LOWEST DAILY MEAN	15		15		.00	
ANNUAL SEVEN-DAY MINIMUM	16		16		.08	
INSTANTANEOUS PEAK FLOW			5070		5070	
INSTANTANEOUS PEAK STAGE			12.85		12.92	
INSTANTANEOUS LOW FLOW					.00	
ANNUAL RUNOFF (AC-FT)	185400		372000		94650	
ANNUAL RUNOFF (CFSM)	.22		.44		.11	
10 PERCENT EXCEEDS	789		2100		348	
50 PERCENT EXCEEDS	105		65		18	
90 PERCENT EXCEEDS	24		26		1.1	

a Median of annual mean discharges is 88 ft³/s.

MINNESOTA RIVER BASIN

05292704 NORTH FORK YELLOW BANK RIVER NEAR ODESSA, MN

LOCATION.--Lat 45°11'21", long 96°24'54", in NW¹/₄NW¹/₄ SW¹/₄ sec. 22, T. 120 N., R. 46 W., Lac qui Parle County, Hydrologic Unit 07020001, on left bank at upstream side of County Highway 87 bridge, 11.0 mi. east-southeast of Milbank, S.D., 6.4 mi southwest of Odessa, and 2.9 mi. upstream from mouth.

DRAINAGE AREA.-- 208 mi².

PERIOD OF RECORD.-- May 1991 to current year.

GAGE.-- Water-stage recorder and crest-stage gage. Elevation of gage is 1020 ft above mean sea level (from topographic map).

REMARKS.-- Records good except those for estimated daily discharges, which are poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.8	e60	e10	e10	e8.5	e10	4100	123	37	23	16	28
2	8.6	e50	e9.0	e11	e9.0	e10	3220	118	38	43	15	23
3	8.2	41	e9.0	e11	e9.0	e10	2280	131	37	28	14	19
4	7.5	35	e10	e11	e9.0	e10	1750	157	36	22	13	18
5	7.6	31	e10	e10	e9.0	e9.0	2090	129	34	19	12	17
6	7.2	27	e10	e9.0	e9.0	e8.0	e3000	117	33	17	14	15
7	7.0	25	e10	e9.0	e8.0	e9.0	1980	157	32	19	13	14
8	7.3	25	e10	e9.0	e8.0	e9.0	1520	109	30	21	13	14
9	7.4	22	e10	e9.0	e8.0	e9.5	1190	101	28	19	13	14
10	7.1	e20	e11	e8.5	e8.0	e9.5	907	96	27	18	13	14
11	7.4	e19	e11	e8.5	e8.0	e10	654	88	26	16	12	13
12	8.1	e17	e11	e8.5	e7.0	e10	586	82	24	15	12	12
13	8.8	e15	e10	e8.5	e7.5	e10	554	77	23	14	11	12
14	8.6	e16	e9.5	e8.5	e7.5	e9.5	602	75	22	14	17	11
15	7.9	e16	e9.0	e8.5	e7.5	e9.5	580	68	21	13	21	18
16	8.4	e16	e9.0	e8.0	e7.5	e8.5	517	64	20	13	21	16
17	28	e16	e9.0	e8.0	e8.0	e9.0	398	62	20	17	20	13
18	48	e15	e9.0	e8.0	e8.5	e10	345	59	19	17	19	12
19	55	e15	e8.5	e8.5	e9.0	e10	380	56	20	18	19	11
20	38	e15	e8.5	e9.0	e9.5	e11	381	55	20	23	21	10
21	27	e14	e8.5	e9.0	e10	e12	333	53	20	22	23	9.3
22	22	e14	e8.5	e9.0	e11	e12	302	51	20	21	19	8.7
23	21	e13	e8.5	e8.5	e10	e12	295	51	20	22	17	8.5
24	19	e12	e8.0	e8.5	e9.0	e12	277	50	18	21	15	8.0
25	18	e11	e8.0	e8.0	e8.5	e12	245	48	17	25	15	7.2
26	16	e10	e8.0	e8.0	e9.0	e13	212	47	17	22	13	7.1
27	16	e11	e8.5	e7.5	e10	e20	180	45	16	21	12	6.9
28	22	e11	e8.5	e7.5	e10	e1000	160	44	15	19	13	6.2
29	25	e12	e8.5	e7.5	---	e3600	147	42	15	18	11	6.0
30	e35	e11	e8.5	e8.0	---	e4000	139	42	16	17	16	5.2
31	e50	---	e9.0	e8.0	---	4210	---	40	---	16	21	---
TOTAL	566.9	615	286.0	271.0	243.0	13094.5	29324	2437	721	613	484	377.1
MEAN	18.3	20.5	9.23	8.74	8.68	422	977	78.6	24.0	19.8	15.6	12.6
MAX	55	60	11	11	11	4210	4100	157	38	43	23	28
MIN	7.0	10	8.0	7.5	7.0	8.0	139	40	15	13	11	5.2
AC-FT	1120	1220	567	538	482	25970	58160	4830	1430	1220	960	748
CFSM	.09	.10	.04	.04	.04	2.03	4.70	.38	.12	.10	.08	.06
IN.	.10	.11	.05	.05	.04	2.34	5.24	.44	.13	.11	.09	.07

e Estimated.

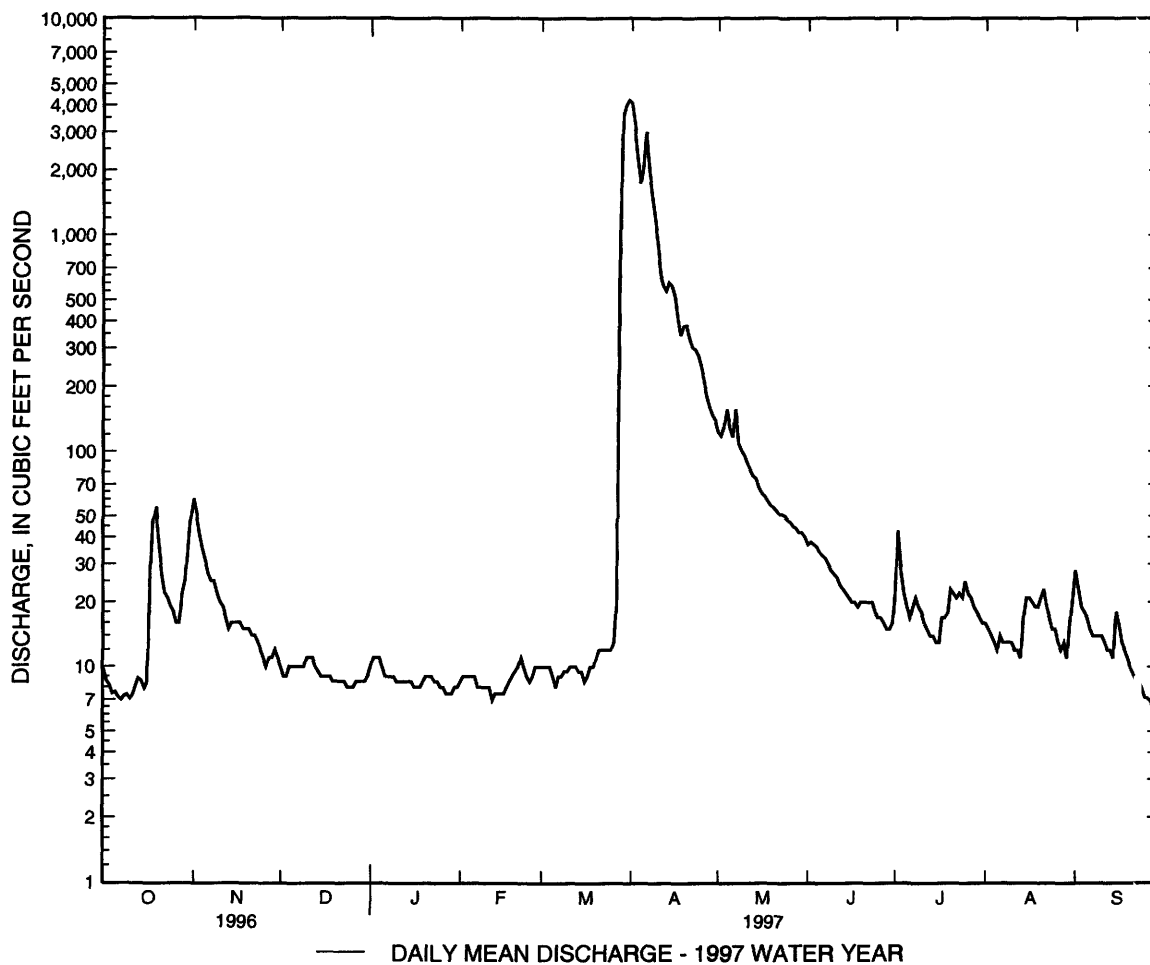
MINNESOTA RIVER BASIN

05292704 NORTH FORK YELLOW BANK RIVER NEAR ODESSA, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	71.2	34.4	16.1	11.1	40.3	247	330	107	112	180	53.2	24.4
MAX	342	122	32.7	19.5	166	422	977	267	212	501	134	72.5
(WY)	1996	1996	1996	1996	1996	1997	1997	1995	1992	1993	1991	1995
MIN	3.98	5.59	5.79	6.28	5.55	36.9	21.8	9.14	24.0	15.4	8.81	6.23
(WY)	1993	1992	1992	1993	1993	1992	1992	1992	1997	1996	1996	1992

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1991 - 1997	
ANNUAL TOTAL	27427.8		49032.5			
ANNUAL MEAN	74.9		134		102	
HIGHEST ANNUAL MEAN					134	
LOWEST ANNUAL MEAN					39.8	
HIGHEST DAILY MEAN	1200		Mar 14		4210	
LOWEST DAILY MEAN	3.9		Sep 18		3.0	
ANNUAL SEVEN-DAY MINIMUM	4.5		Sep 14		3.4	
INSTANTANEOUS PEAK FLOW			4670		Mar 31	
INSTANTANEOUS PEAK STAGE			18.02 _a		Mar 29	
ANNUAL RUNOFF (AC-FT)	54400		97260		74030	
ANNUAL RUNOFF (CFSM)	.36		.65		.49	
ANNUAL RUNOFF (INCHES)	4.91		8.77		6.68	
10 PERCENT EXCEEDS	216		134		238	
50 PERCENT EXCEEDS	20		14		23	
90 PERCENT EXCEEDS	7.0		8.0		6.5	

^a Backwater from ice.

MINNESOTA RIVER BASIN

05293000 YELLOW BANK RIVER NEAR ODESSA, MN

LOCATION.--Lat 45°13'35", long 96°21'12", in SW¹/₄SW¹/₄ sec. 6, T. 120 N., R. 45 W., Lac qui Parle County, Hydrologic Unit 07020001, on left bank 600 ft downstream from highway bridge, 2.5 mi southwest of Odessa, and 4.5 mi upstream from mouth.

DRAINAGE AREA.--398 mi².

PERIOD OF RECORD.--October 1939 to current year.

REVISED RECORDS.--WSP 1388: 1947(M), 1950.

REVISIONS.-- Daily-mean discharge for Sept. 30, 1995 changed to 105 ft³/s.

GAGE.--Water-stage recorder. Datum of gage is 953.34 ft above mean sea level (U.S. Army Corps of Engineers bench mark). Prior to Aug. 28, 1940, nonrecording gage at site 150 ft upstream at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 300 ft³/s and maximum(*).

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 02	(unknown)	*6770	*17.94	July 02	1200	368	4.75

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	39	136	e43	e20	e14	e21	6020	261	86	47	42	51
2	33	155	e43	e19	e14	e21	6190	250	82	315	40	52
3	30	168	e43	e19	e14	e22	5150	257	81	223	37	42
4	26	128	e43	e19	e14	e22	3460	284	80	133	35	38
5	26	115	e42	e19	e14	e23	3260	273	76	106	32	35
6	25	108	e41	e18	e14	e21	e2800	242	73	88	37	32
7	26	103	e40	e18	e13	e22	e2600	270	67	80	36	31
8	25	99	e39	e18	e13	e23	2480	231	64	81	32	31
9	24	95	e38	e18	e13	e24	1970	212	60	73	32	32
10	25	92	e38	e18	e13	e25	1630	203	56	65	32	29
11	24	e80	e37	e17	e13	e26	1240	190	53	57	30	29
12	26	e72	e37	e17	e13	e28	1100	176	50	51	30	27
13	28	e86	e36	e17	e13	e30	1000	167	46	46	28	25
14	30	e80	e35	e17	e13	e32	985	158	46	41	39	23
15	28	e76	e35	e17	e13	e33	977	149	44	37	53	41
16	28	e76	e35	e16	e13	e34	862	140	41	33	46	45
17	67	e75	e34	e16	e13	e37	723	134	40	50	50	35
18	122	e75	e34	e16	e14	e39	627	129	38	46	47	30
19	165	e74	e28	e17	e15	e42	610	122	38	45	51	26
20	152	e72	e25	e16	e17	e40	609	119	38	59	56	23
21	129	e70	e26	e16	e17	e40	565	116	37	62	56	22
22	113	e68	e27	e16	e18	e40	527	111	37	57	52	20
23	96	e67	e25	e16	e18	e41	495	109	37	55	47	19
24	88	e66	e23	e16	e18	e41	472	109	35	53	41	19
25	83	e59	e21	e15	e18	e42	432	107	33	54	38	18
26	78	e55	e21	e15	e19	e45	387	106	31	55	34	16
27	73	e52	e21	e15	e20	e70	345	103	29	52	31	15
28	70	e51	e20	e15	e20	e440	316	98	27	51	29	15
29	75	e49	e20	e15	---	e1480	295	96	28	46	26	12
30	95	e48	e20	e15	---	6080	282	94	29	42	36	9.8
31	115	---	e20	e14	---	6050	---	90	---	42	37	---
TOTAL	1964	2550	990	520	421	14934	48409	5106	1482	2245	1212	842.8
MEAN	63.4	85.0	31.9	16.8	15.0	482	1614	165	49.4	72.4	39.1	28.1
MAX	165	168	43	20	20	6080	6190	284	86	315	56	52
MIN	24	48	20	14	13	21	282	90	27	33	26	9.8
AC-FT	3900	5060	1960	1030	835	29620	96020	10130	2940	4450	2400	1670
CFSM	.16	.21	.08	.04	.04	1.21	4.05	.41	.12	.18	.10	.07

e Estimated

MINNESOTA RIVER BASIN

05293000 YELLOW BANK RIVER NEAR ODESSA, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 1997, BY WATER YEAR (WY)

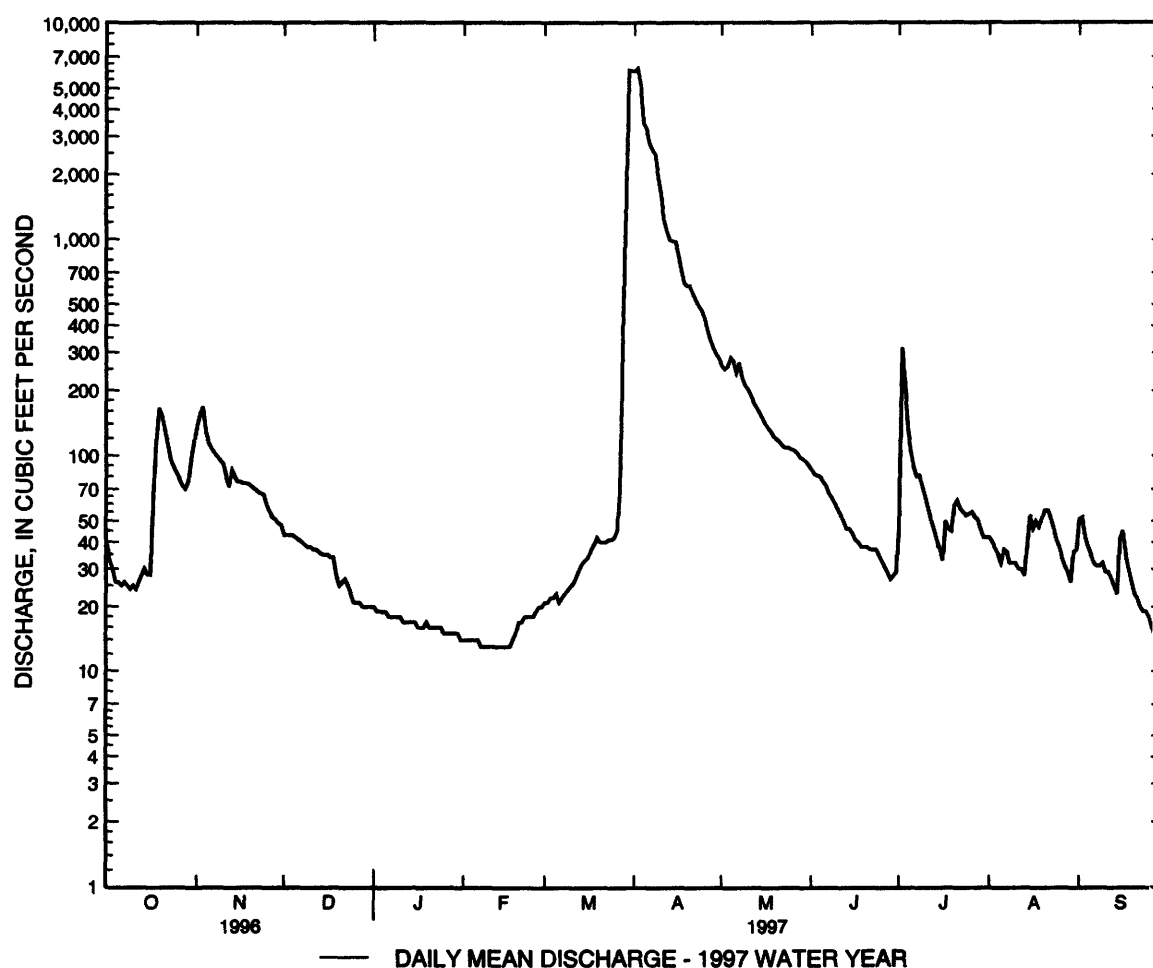
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	25.2	23.4	12.0	7.25	14.0	177	268	109	105	67.9	31.4	17.6
MAX	588	256	86.3	68.0	117	693	1614	652	577	741	281	273
(WY)	1996	1996	1996	1994	1984	1996	1997	1972	1992	1993	1991	1985
MIN	.31	.44	.32	.090	.001	1.59	9.13	2.94	1.83	.27	.088	.083
(WY)	1941	1977	1977	1977	1977	1965	1981	1981	1976	1976	1976	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1940 - 1997	
ANNUAL TOTAL	63676		80675.8			
ANNUAL MEAN	174		221		71.6 _a	
HIGHEST ANNUAL MEAN					237	
LOWEST ANNUAL MEAN					3.98	
HIGHEST DAILY MEAN	2920		6190		6640	
LOWEST DAILY MEAN	10		9.8		.00 _b	
ANNUAL SEVEN-DAY MINIMUM	14		13		.00	
INSTANTANEOUS PEAK FLOW			6770		6970	
INSTANTANEOUS PEAK STAGE			17.94 _c		19.07 _c	
INSTANTANEOUS LOW FLOW					.00	
ANNUAL RUNOFF (AC-FT)	126300		160000		51880	
ANNUAL RUNOFF (CFSM)	.44		.56		.18	
10 PERCENT EXCEEDS	434		277		150	
50 PERCENT EXCEEDS	59		41		11	
90 PERCENT EXCEEDS	21		16		1.0	

a Median of annual mean discharges is 52.7 ft³/s.

b Many days, several years.

c From highwater mark.



MINNESOTA RIVER BASIN

05294000 POMME DE TERRE RIVER AT APPLETON, MN

LOCATION.--Lat 45°12'10", long 96°01'20", in SW¹/₄NW¹/₄ sec. 14, T.120 N., R.43 W., Swift County, Hydrologic Unit 07020002, on left bank 60 ft upstream from bridge on U.S. Highway 59 and State Highway 119 at Appleton and 8 mi upstream from mouth.

DRAINAGE AREA.--905 mi², approximately.

PERIOD OF RECORD.--March 1931 to September 1935 (no winter records), October 1935 to current year. Prior to October 1953, published as "near Appleton."

REVISED RECORDS.--WSP 1308: 1931(M), 1937(M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 978.00 ft above mean sea level. Prior to Dec. 22, 1952, nonrecording gage at site 4 mi upstream at datum 25.17 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow affected by lakes above station. Occasional regulation at low flow by old mill dam 500 ft upstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft³/s and maximum (*)

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 18	1500	248	4.86	July 03	1200	596	5.76
Oct. 31	0400	342	5.16	July 26	1800	234	4.81
Nov. 04	0600	259	4.90	Aug. 06	0500	237	4.82
Apr. 07	---	* _a 8890	* _a 18.13				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	63	219	108	e44	e26	110	975	1150	354	e300	170	144
2	63	178	111	e44	e26	104	3460	1110	334	e450	160	143
3	62	228	e103	e43	e26	104	4000	1070	328	574	153	135
4	64	245	e104	e40	e26	109	4120	1020	324	450	147	142
5	64	200	e104	e39	e26	109	5090	964	313	354	145	138
6	60	193	e104	e37	e26	112	e6760	918	303	299	178	131
7	58	188	e103	e35	e27	116	e6600	877	290	286	196	125
8	58	180	e100	e33	e28	120	e5900	832	281	315	188	118
9	60	176	e100	e31	e30	123	e5200	806	269	335	187	111
10	60	155	e97	e28	e33	118	e4700	775	257	290	188	106
11	60	83	e97	e24	37	110	e4200	735	252	265	183	106
12	60	98	e96	e21	39	107	e3800	707	257	246	175	99
13	58	133	e92	e21	43	107	e3500	e695	252	233	167	95
14	57	132	e86	e21	47	107	e3200	681	240	224	184	92
15	55	127	e82	e22	52	109	e3000	657	231	215	198	106
16	70	127	e74	e20	57	113	e2800	629	221	205	202	103
17	113	117	e60	e19	64	116	e2600	609	212	215	190	101
18	179	111	e44	e20	67	116	2510	592	206	205	180	97
19	209	128	38	e21	73	114	2340	567	202	203	177	93
20	174	133	e39	e20	76	117	2230	547	199	193	183	89
21	146	117	e39	e20	76	121	2080	520	195	185	204	88
22	127	125	e40	e21	76	116	1930	488	192	182	198	87
23	120	126	e40	e21	80	116	1790	465	191	178	192	84
24	118	120	e39	e22	86	117	1670	456	199	173	183	82
25	117	118	e38	e23	94	120	1550	442	188	172	174	81
26	118	115	e38	e25	97	130	1450	420	182	215	167	80
27	124	120	e37	e25	101	143	1370	399	e179	228	158	78
28	133	118	e37	e24	108	166	1310	386	e170	230	150	76
29	146	121	e39	e24	---	221	1260	379	e164	220	146	73
30	227	112	e41	e24	---	322	1210	381	e162	200	156	75
31	319	---	e43	e27	---	443	---	372	---	181	139	---
TOTAL	3342	4343	2173	839	1547	4256	92605	20649	7147	8021	5418	3078
MEAN	108	145	70.1	27.1	55.3	137	3087	666	238	259	175	103
MAX	319	245	111	44	108	443	6760	1150	354	574	204	144
MIN	55	83	37	19	26	104	975	372	162	172	139	73
AC-FT	6630	8610	4310	1660	3070	8440	183700	40960	14180	15910	10750	6110
CFSM	.12	.16	.08	.03	.06	.15	3.41	.74	.26	.29	.19	.11

a Due in part to dam failure; from highwater mark.

e Estimated

MINNESOTA RIVER BASIN

05294000 POMME DE TERRE RIVER AT APPLETON, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1997, BY WATER YEAR (WY)

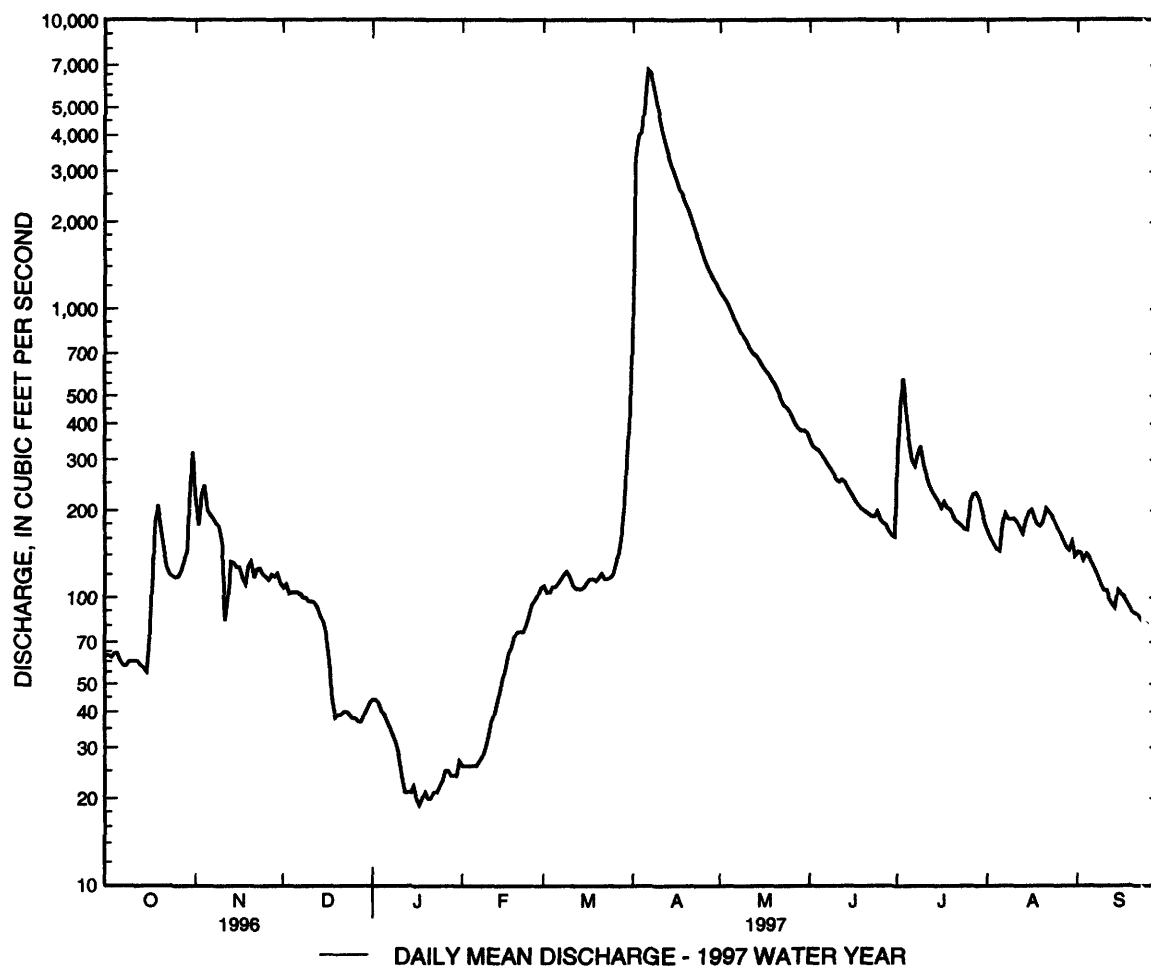
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	67.5	63.9	42.1	27.0	26.0	163	406	211	165	143	77.5	55.9
MAX	550	402	182	141	148	675	3087	846	516	1382	752	331
(WY)	1996	1996	1987	1987	1987	1995	1997	1969	1965	1993	1993	1986
MIN	.000	3.52	1.00	.000	.000	2.04	20.9	8.09	2.17	.45	.095	.047
(WY)	1989	1989	1937	1937	1936	1969	1934	1934	1933	1988	1988	1988

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1931 - 1997
ANNUAL TOTAL	94427	153418	
ANNUAL MEAN	258	420	128 ^a
HIGHEST ANNUAL MEAN			420
LOWEST ANNUAL MEAN			21.1
HIGHEST DAILY MEAN	1280	Mar 17	6760
LOWEST DAILY MEAN	26	Jan 19	19
ANNUAL SEVEN-DAY MINIMUM	38	Dec 23	20
INSTANTANEOUS PEAK FLOW			8890 ^b
INSTANTANEOUS PEAK STAGE			18.13 ^b
INSTANTANEOUS LOW FLOW			.00 ^c
ANNUAL RUNOFF (AC-FT)	187300	304300	92930
ANNUAL RUNOFF (CFSM)	.29	893	289
50 PERCENT EXCEEDS	120	133	49
90 PERCENT EXCEEDS	59	37	6.5

a Median of annual mean discharges is 94.7 ft³/s.

b Due in part to dam failure; from highwater mark.

c Many days, several years.



MINNESOTA RIVER BASIN

05300000 LAC QUI PARLE RIVER NEAR LAC QUI PARLE, MN

LOCATION.--Lat 44°59'42", long 95°55'09", in SW¹/₄SW¹/₄ sec. 27, T.118 N., R.42 W., Lac qui Parle County, Hydrologic Unit 07020003, on right bank 40 ft downstream from highway bridge and 0.5 mi southwest of city of Lac qui Parle.

DRAINAGE AREA.--983 mi².

PERIOD OF RECORD.--April 1910 to November 1914; March 1931 to current year (winter records incomplete prior to 1934). Published as "at Lac qui Parle," 1910-14.

REVISED RECORDS.--WSP 1308: 1912(M), 1935(M).

GAGE.--Water-stage recorder. Datum of gage is 951.98 ft above mean sea level (Minnesota Department of Transportation benchmark). Apr. 27, 1910 to Nov. 15, 1914, nonrecording gage at site 2 mi downstream at different datum. Mar. 17, 1931 to Mar. 9, 1937, nonrecording gage at site 40 ft upstream at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair to poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	80	302	e96	e48	e16	e32	8600	788	226	e93	407	121
2	79	256	e97	e51	e17	e31	10200	740	212	e90	383	121
3	70	278	e92	e44	e17	e30	11600	727	200	e88	361	120
4	67	261	e91	e39	e17	e31	10900	761	192	e86	323	100
5	65	232	e90	e34	e17	e33	10300	828	184	e130	304	105
6	63	216	e88	e31	e17	e35	11600	794	175	e200	380	102
7	61	203	e86	e28	e17	e36	e12000	722	166	e281	416	93
8	56	194	e85	e25	e17	e38	e9380	657	156	e313	428	90
9	65	184	e83	e23	e17	e40	e7970	611	145	288	405	85
10	64	172	e82	e21	e17	e42	e8130	588	139	263	357	81
11	58	146	e80	e20	e17	e44	e8240	556	139	241	316	81
12	58	e145	e77	e19	e17	e46	e8590	531	141	220	299	81
13	61	e142	e73	e19	e17	e49	e8350	500	144	199	285	77
14	64	e140	e70	e19	e17	e51	e5080	469	136	184	269	74
15	66	e136	e68	e20	e17	e54	3440	440	128	170	252	70
16	77	134	e66	e18	e17	e57	3090	419	120	159	240	67
17	105	e130	e64	e17	e18	e60	2820	398	e117	158	228	65
18	160	e128	e56	e17	e20	e62	2570	376	e112	187	215	66
19	240	e124	e51	e18	e22	e64	2320	351	e109	209	202	66
20	280	e119	e47	e18	e25	e66	2100	331	e106	208	194	66
21	240	e115	e43	e18	e26	e69	1940	318	e101	210	186	64
22	186	e113	e39	e17	e26	e71	1780	305	e98	188	184	61
23	153	e111	e35	e17	e27	e72	1630	293	e96	182	178	54
24	136	e109	e36	e17	e28	e74	1480	289	e94	202	169	47
25	125	e108	e38	e16	e29	e77	1350	286	e91	212	161	45
26	122	e106	e40	e16	e30	e90	1220	281	110	216	153	44
27	130	e105	e43	e16	e31	e300	1120	272	109	353	145	44
28	117	e106	e46	e16	e32	e850	1030	259	94	493	137	42
29	121	e107	e49	e16	---	e1820	941	249	102	501	130	39
30	206	e100	e50	e16	---	e4000	858	241	102	460	125	34
31	259	---	e49	e16	---	e5000	---	235	---	422	123	---
TOTAL	3634	4722	2010	710	585	13324	160629	14615	4044	7206	7955	2205
MEAN	117	157	64.8	22.9	20.9	430	5354	471	135	232	257	73.5
MAX	280	302	97	51	32	5000	12000	828	226	501	428	121
MIN	56	100	35	16	16	30	858	235	91	86	123	34
AC-FT	7210	9370	3990	1410	1160	26430	318600	28990	8020	14290	15780	4370
CFSM	.12	.16	.07	.02	.02	.44	5.45	.48	.14	.24	.26	.07

e Estimated

MINNESOTA RIVER BASIN

05300000 LAC QUI PARLE RIVER NEAR LAC QUI PARLE, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1910 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	42.6	47.3	24.3	11.1	19.0	299	607	242	271	144	78.3	38.6
MAX	629	378	149	88.1	140	1634	5354	1264	1762	1613	765	535
(WY)	1996	1996	1996	1994	1984	1985	1997	1995	1984	1993	1953	1985
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1932	1932	1932	1932	1934	1934	1934	1934	1934	1934	1931	1931

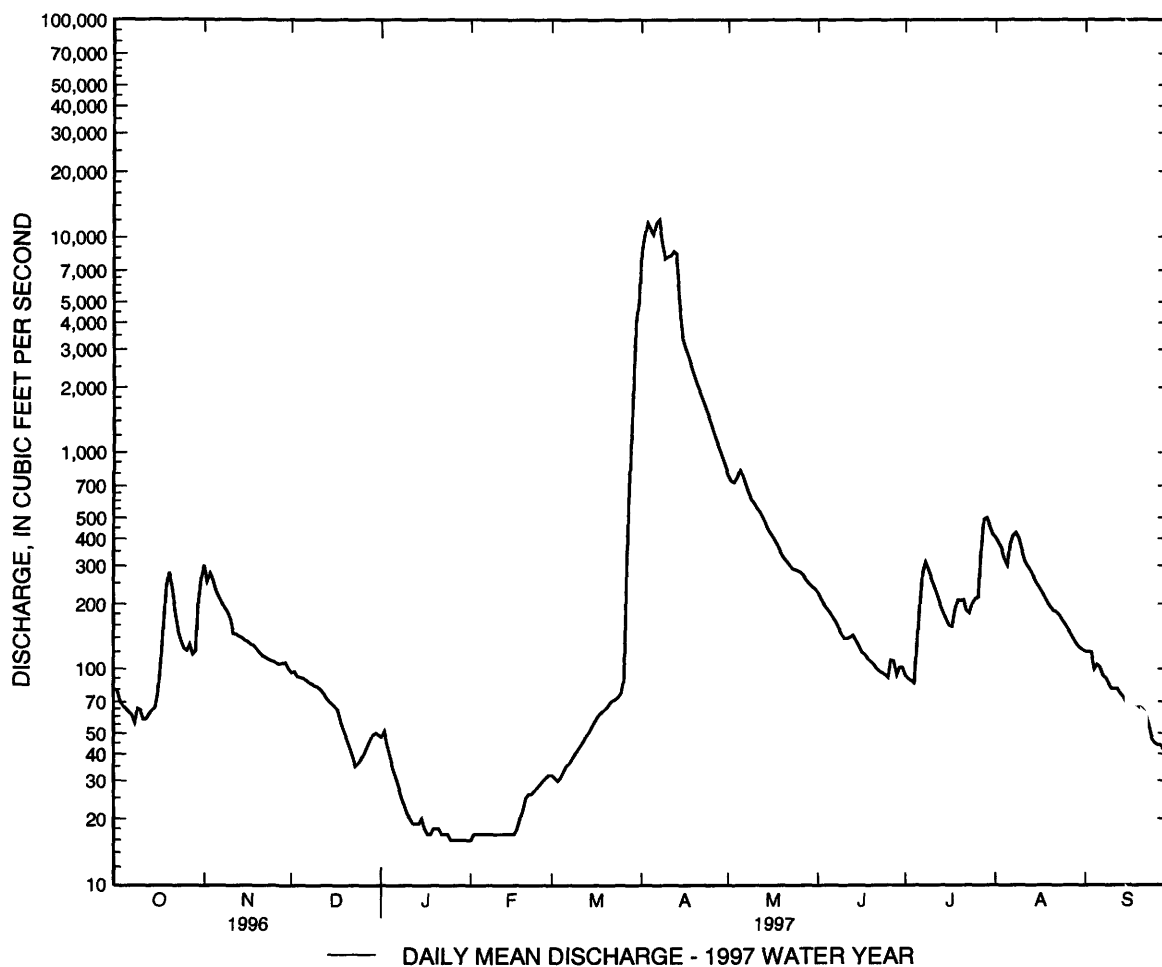
SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1910 - 1997	
ANNUAL TOTAL	101529		221639			
ANNUAL MEAN	277		607		160 ^a	
HIGHEST ANNUAL MEAN					625	
LOWEST ANNUAL MEAN					.000	
HIGHEST DAILY MEAN	1730	May 22	12000	Apr 7	16000	Apr 10 1969
LOWEST DAILY MEAN	12	Sep 17	16	Jan 25	.00 ^b	Jul 15 1931
ANNUAL SEVEN-DAY MINIMUM	15	Sep 3	16	Jan 25	.00	Jul 15 1931
INSTANTANEOUS PEAK FLOW			13100 ^c	Apr 7	17100	Apr 10 1969
INSTANTANEOUS PEAK STAGE			17.68	Apr 7	19.37 ^d	Apr 9 1965
INSTANTANEOUS LOW FLOW					.00 ^b	Jul 15 1931
ANNUAL RUNOFF (AC-FT)	201400		439600		116300	
ANNUAL RUNOFF (CFSM)	.28		.62		.16	
10 PERCENT EXCEEDS	886		790		349	
50 PERCENT EXCEEDS	87		110		20	
90 PERCENT EXCEEDS	37		20		.50	

a Median of annual mean discharges is 115 ft³/s.

b Many days, several years.

c From highwater mark.

d From highwater mark, backwater from ice.



MINNESOTA RIVER BASIN

05304500 CHIPPEWA RIVER NEAR MILAN, MN

LOCATION.--Lat 45°06'39", long 95°47'57", in SE 1/4 SE 1/4 sec. 16, T.119 N., R.41 W., Chippewa County, Hydrologic Unit 07020005, on right bank 800 ft upstream from bridge on State Highway 40, 2.0 mi upstream from small tributary, and 5.5 mi east of Milan.

DRAINAGE AREA.--1,870 mi², approximately.

PERIOD OF RECORD.--March 1937 to current year.

REVISED RECORDS.--WSP 1145: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 959.69 ft above mean sea level. Prior to June 15, 1942, nonrecording gage on bridge 800 ft downstream at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Flow may be influenced by regulation from several small lakes upstream from gage.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft³/s, and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct. 19	0300	428	2.82	July 04	0500	3180	7.14
Nov. 03	0800	585	3.13	July 20	2000	1540	4.7?
Apr. 06	--	*14,400	*18.03				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	196	514	e250	e88	e100	e136	5740	2730	984	1450	785	553
2	191	518	e245	e92	e101	e137	5830	2600	944	2340	754	604
3	174	513	e240	e96	e102	e138	e8110	2540	906	3120	726	606
4	168	534	e238	e98	e101	e140	e12000	2460	875	3150	733	593
5	172	475	e233	e97	e100	e141	e13200	2310	846	3020	765	571
6	175	456	e230	e88	e100	e142	e13400	2200	815	2740	850	535
7	170	449	e225	e86	e99	e143	e11300	2120	781	2380	940	503
8	165	429	e220	e86	e99	e148	e10200	2060	749	2230	945	482
9	158	383	e218	e84	e99	e149	e9670	1990	717	2170	898	464
10	152	371	e210	e84	e98	e142	e9080	1900	686	1940	851	449
11	148	375	e205	e83	e98	e139	e8480	1820	658	1730	805	441
12	146	351	e198	e82	e98	e133	e7920	1740	628	1580	764	411
13	145	e270	e190	e81	e98	e132	e7300	1650	597	1480	730	397
14	150	e275	e182	e81	e98	e136	e6850	1580	564	1390	709	394
15	143	e300	e175	e80	e98	e139	e6370	1540	539	1290	741	400
16	142	e325	e170	e81	e99	e145	e5930	1480	523	1200	753	440
17	214	e340	e160	e82	e100	e148	e5510	1430	505	1160	747	464
18	364	e320	e155	e83	e101	e149	5120	1390	490	1090	729	453
19	427	e315	e150	e85	e103	e150	4830	1330	480	1020	728	432
20	425	e305	e145	e88	e105	e155	4610	1300	474	1280	769	412
21	408	e310	e138	e88	e106	e152	4510	1260	458	1430	819	400
22	377	e310	e132	e87	e108	e155	4370	1220	442	1190	837	390
23	343	e305	e128	e84	e110	e159	4160	1190	441	1060	839	384
24	332	e295	e123	e86	e115	e162	3930	1210	432	992	837	378
25	323	e285	e118	e88	e120	e163	3720	1200	410	983	795	370
26	314	e280	e111	e89	e125	e165	3520	1170	399	1010	748	362
27	331	e275	e107	e90	e130	e175	3350	1130	380	993	697	353
28	331	e270	e100	e92	e135	e215	3210	1090	368	940	648	344
29	342	e265	e97	e94	---	e300	3060	1060	489	890	610	328
30	463	e260	e94	e96	---	e550	2890	1050	1240	853	603	318
31	526	---	e90	e98	---	e1500	---	1020	---	813	570	---
TOTAL	8115	10673	5277	2717	2946	6538	198170	50770	18820	48914	23725	13231
MEAN	262	356	170	87.6	105	211	6606	1638	627	1578	765	441
MAX	526	534	250	98	135	1500	13400	2730	1240	3150	945	606
MIN	142	260	90	80	98	132	2890	1020	368	813	570	318
AC-FT	16100	21170	10470	5390	5840	12970	393100	100700	37330	97020	47060	26240
CFSM	.14	.19	.09	.05	.06	.11	3.53	.88	.34	.84	.41	.24
IN.	.16	.21	.10	.05	.06	.13	3.94	1.01	.37	.97	.47	.26

e Estimated

MINNESOTA RIVER BASIN

05304500 CHIPPEWA RIVER NEAR MILAN, MN--Continued

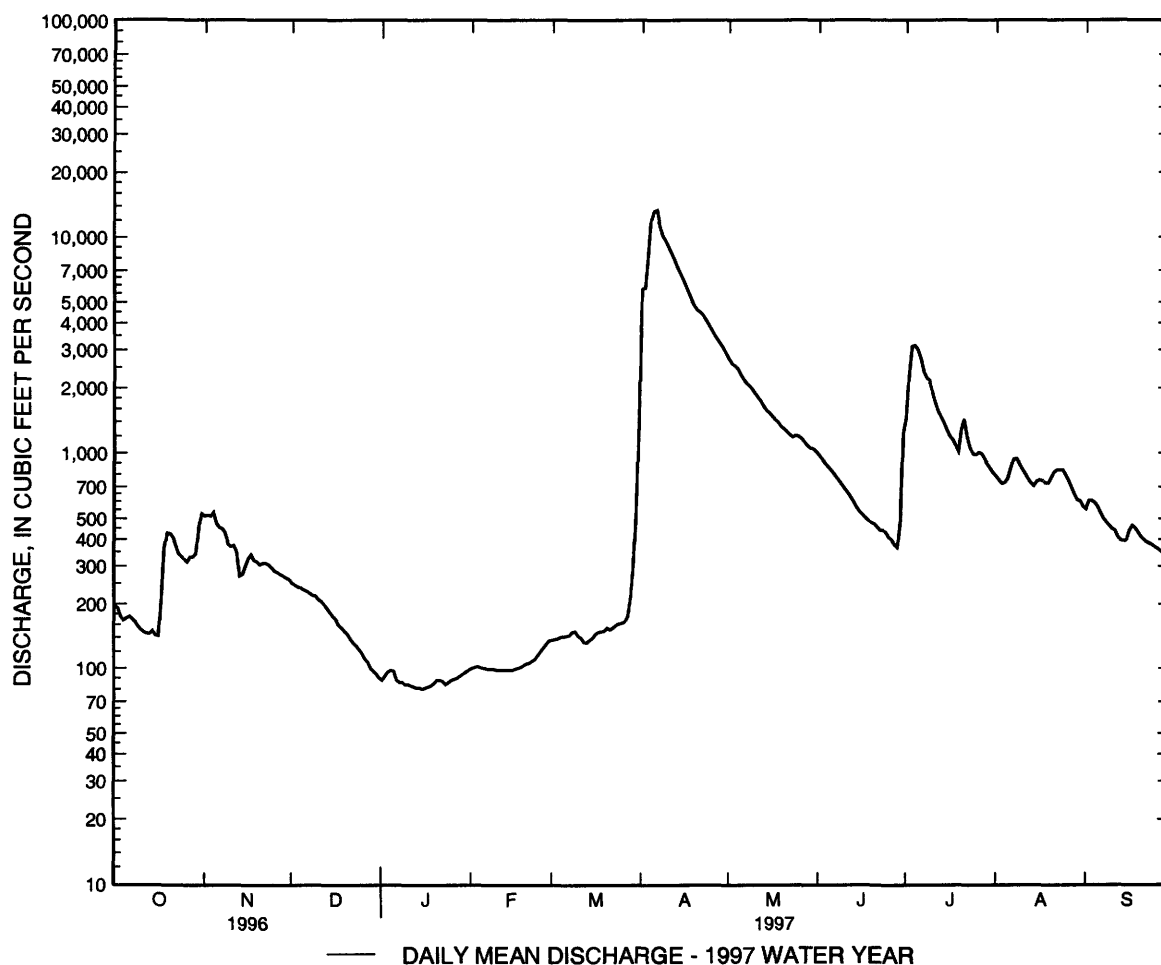
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	234	195	119	68.9	65.6	401	1071	674	579	468	266	220
MAX	1996	1318	655	425	404	2141	6606	2462	2248	2507	2183	2273
(WY)	1985	1985	1985	1987	1987	1985	1997	1986	1984	1995	1993	1986
MIN	5.51	8.67	4.77	.094	.000	2.92	90.9	81.6	36.8	15.1	6.19	3.50
(WY)	1977	1977	1977	1940	1940	1965	1959	1939	1940	1940	1976	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1938 - 1997
ANNUAL TOTAL	270141	389896	
ANNUAL MEAN	738	1068	364 ^a
HIGHEST ANNUAL MEAN			1307
LOWEST ANNUAL MEAN			45.4
HIGHEST DAILY MEAN	3400	May 19	13400
LOWEST DAILY MEAN	90	Dec 31	80
ANNUAL SEVEN-DAY MINIMUM	102	Dec 25	81
INSTANTANEOUS PEAK FLOW		14400	Apr 6
INSTANTANEOUS PEAK STAGE		18.03 ^b	Apr 6
INSTANTANEOUS LOW FLOW		80	Jan 15
ANNUAL RUNOFF (AC-FT)	535800	773400	263700
ANNUAL RUNOFF (CFSM)	.39	.57	.19
ANNUAL RUNOFF (INCHES)	5.37	7.76	2.65
10 PERCENT EXCEEDS	1840	2560	979
50 PERCENT EXCEEDS	344	400	131
90 PERCENT EXCEEDS	171	98	15

a Median of annual mean discharges is 274 ft³/s.

b From highwater mark.



MINNESOTA RIVER BASIN

05311000 MINNESOTA RIVER AT MONTEVIDEO, MN

LOCATION.--Lat 44°56'00", long 95°44'00", in NW¼NW¼ sec. 19, T.117 N., R.40 W., Yellow Medicine County, Hydrologic Unit 07020004, on right bank 100 ft upstream from bridge on U.S. Highway 212, at Montevideo, and 400 ft downstream from Chippewa River.

DRAINAGE AREA.--6,180 mi², approximately.

PERIOD OF RECORD.--July 1909 to September 1917, October 1917 to September 1929 (no winter records), October 1929 to current year. Prior to October 1939, published as "near Montevideo." Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1035: 1919(M). WSP 1085: 1935-36. WSP 1508: 1912, 1925(M), 1929(M).

GAGE.--Water-stage recorder. Datum of gage is 909.12 ft above mean sea level. July 22, 1909 to Feb. 4, 1932, nonrecording gage at bridge 600 ft downstream at present datum. Feb. 5, 1932 to Nov. 26, 1934, nonrecording gage at bridge 100 ft downstream at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Flow regulated by Big Stone Lake since Apr. 17, 1937, Lac qui Parle since Jan. 1938, and Marsh Lake since Nov. 1, 1939.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	201	1390	e1120	e190	e120	e170	6660	9740	3080	958	1550	866
2	187	1530	e1110	e180	e120	e180	10700	9570	3010	1530	1630	877
3	181	1580	e1100	e180	e120	e180	15700	9310	3000	2680	1620	1040
4	180	1580	e1080	e190	e120	e190	30000	9050	3080	2920	1610	927
5	175	1570	e1040	e190	e120	e190	38300	8910	3110	3070	1570	922
6	172	1570	e1000	e200	e120	e200	45900	8670	3020	3200	1480	1080
7	174	1570	e950	e190	e120	e210	46800	8370	2650	3310	1470	1140
8	176	e1450	e910	e180	e120	e230	43300	8210	2560	3370	1480	1030
9	173	e1410	e870	e180	e120	e250	39100	8050	e2280	3370	1470	821
10	168	e1390	e830	e170	e120	e270	37300	7730	e2120	3330	e1450	934
11	260	e1370	e798	e160	e120	e290	34900	7570	e1950	3280	e1430	932
12	282	e1360	e750	e160	e120	e320	30700	7350	1880	3250	e1400	796
13	284	e1350	e690	e150	e120	e350	27800	e7080	1790	3220	e1380	577
14	292	e1340	e660	e150	e120	e390	25600	e6590	1420	3200	e1400	534
15	300	e1350	e620	e150	e125	e420	e23800	e6100	1370	3190	e1380	542
16	436	e1320	e550	e140	e130	e450	e22100	5350	1360	3130	e1340	515
17	539	e1300	e510	e140	e130	e500	e20300	4700	1340	2710	e1300	479
18	630	e1290	e460	e130	e140	e560	e18600	4300	1340	2340	e1280	473
19	743	e1280	e400	e130	e140	e610	16800	4140	1320	2180	e1300	613
20	754	e1270	e360	e120	e150	e670	15700	3870	1250	2100	1320	710
21	856	e1250	e350	e120	e150	e750	14800	3450	e1130	2200	1330	715
22	1210	e1240	e340	e110	e160	e850	13900	3230	e1020	2440	1330	701
23	1280	e1220	e340	e110	e160	e910	13300	3200	e900	2340	1330	627
24	1380	e1210	e330	e105	e160	1110	12600	3230	e880	2060	1330	614
25	1350	e1210	e330	e110	e160	1140	12000	3210	e860	2060	1310	598
26	1330	e1200	e320	e110	e160	1270	11400	3130	e740	2040	1100	511
27	1340	e1190	e260	e110	e170	1390	10900	3070	e620	2020	1270	387
28	1320	e1180	e230	e110	e170	1950	10500	3110	585	1980	1290	365
29	1320	e1160	e220	e120	---	2450	10300	3160	600	1840	1260	363
30	1540	e1140	e210	e120	---	2950	9940	3150	628	1770	968	365
31	1430	---	e200	e120	---	3570	---	3120	---	1710	887	---
TOTAL	20663	40270	18938	4525	3785	24970	669700	179720	50893	78798	42265	21054
MEAN	667	1342	611	146	135	805	22320	5797	1696	2542	1363	702
MAX	1540	1580	1120	200	170	3570	46800	9740	3110	3370	1630	1140
MIN	168	1140	200	105	120	170	6660	3070	585	958	887	363
AC-FT	40990	79880	37560	8980	7510	49530	1328000	356500	100900	156300	83830	41760
CFSM	.11	.22	.10	.02	.02	.13	3.61	.94	.27	.41	.22	.11
IN.	.12	.24	.11	.03	.02	.15	4.03	1.08	.31	.47	.25	.13

e Estimated

MINNESOTA RIVER BASIN

05311000 MINNESOTA RIVER AT MONTEVIDEO, MN--Continued

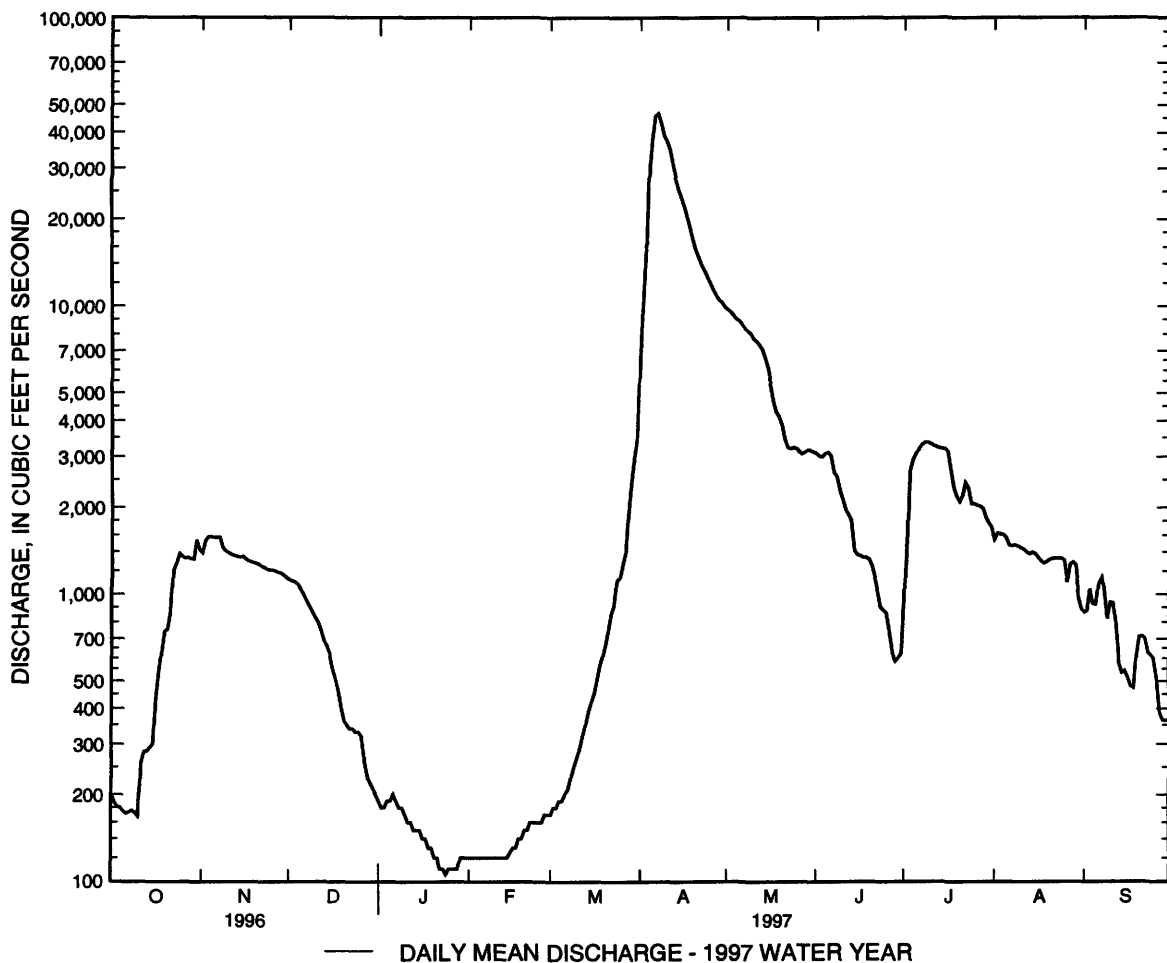
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	357	370	271	172	192	923	2802	1581	1305	1136	585	344
MAX	3675	3797	2052	962	909	5363	22320	7315	5088	7853	7084	2613
(WY)	1996	1996	1996	1996	1996	1994	1997	1986	1984	1993	1993	1986
MIN	.76	1.61	2.35	1.57	1.06	5.06	7.82	3.13	1.40	1.89	.60	.57
(WY)	1934	1935	1935	1934	1937	1934	1934	1934	1934	1933	1933	1933

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1909 - 1997
ANNUAL TOTAL	851843	1155581	
ANNUAL MEAN	2327	3166	884 ^a
HIGHEST ANNUAL MEAN			3166
LOWEST ANNUAL MEAN			4.43
HIGHEST DAILY MEAN	9600	Mar 26	46800
LOWEST DAILY MEAN	163	Sep 18	105
ANNUAL SEVEN-DAY MINIMUM	174	Oct 4	109
INSTANTANEOUS PEAK FLOW			47500
INSTANTANEOUS PEAK STAGE			23.90
ANNUAL RUNOFF (AC-FT)	1690000	2292000	640400
ANNUAL RUNOFF (INCHES)	5.13	6.96	1.94
10 PERCENT EXCEEDS	6560	8270	2180
50 PERCENT EXCEEDS	1150	1180	244
90 PERCENT EXCEEDS	286	150	35

a Median of annual mean discharges is 626 ft³/s.

b Many days in 1933, 34, and 36.



MINNESOTA RIVER BASIN

05313500 YELLOW MEDICINE RIVER NEAR GRANITE FALLS, MN

LOCATION.--Lat 44°43'18", long 95°31'07", in SW¼ sec. 35, T.115 N., R.39 W., Yellow Medicine County, Hydrologic Unit 07020004, on right bank 50 ft downstream from highway bridge, 6 mi upstream from mouth, and 8 mi south of town of Granite Falls.

DRAINAGE AREA.--653 mi².

PERIOD OF RECORD.--March 1931 to September 1935 (no winter records), October 1935 to September 1938, October 1939 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1508: 1931, 1934(M), 1937(M), 1946(M), 1950(M).

GAGE.--Water-stage recorder. Datum of gage is 960.64 ft above mean sea level. Mar. 16, 1931 to June 13, 1938, nonrecording gage, on bridge 50 ft upstream at present datum. Oct. 12, 1939 to Nov. 30, 1952, nonrecording gage 500 ft downstream at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1919 reached a stage of 17.5 ft, from information by local residents, discharge, 25,200 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 300 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Mar. 31	2300	*9020	*11.80	July 28	0400	1450	5.56
June 25	0400	361	3.66				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18	253	e74	e13	e9.2	e28	7980	500	177	152	481	66
2	16	182	e77	e13	e9.4	e28	7570	482	165	145	402	73
3	16	202	e93	e13	e9.6	e28	7170	482	157	139	338	67
4	15	168	e99	e13	e9.6	e28	6270	558	147	116	297	132
5	16	148	e105	e13	e9.6	e29	5430	621	143	101	442	106
6	17	147	e108	e12	e9.6	e31	5310	563	137	86	362	84
7	18	130	e104	e12	e9.8	e33	5300	514	128	78	290	69
8	18	115	e100	e11	e9.8	e35	5390	469	118	72	270	57
9	20	105	e98	e10	e10	e38	5300	434	109	64	240	52
10	30	85	e96	e9.4	e10	e38	4860	430	99	62	207	53
11	27	53	e96	e8.8	e11	e37	3950	397	95	62	200	57
12	22	55	e98	e8.3	e11	e40	3270	364	88	56	204	50
13	19	75	e92	e8.2	e12	e42	2780	344	82	54	187	46
14	18	72	e94	e8.1	e13	e45	2490	325	75	62	171	43
15	19	66	e97	e8.0	e13	e50	2270	304	73	57	154	42
16	20	68	94	e7.9	e14	e57	2060	290	68	53	141	44
17	26	69	70	e7.8	e15	e56	1850	276	63	56	127	44
18	57	72	51	e7.9	e16	e58	1640	269	57	66	112	45
19	58	66	36	e8.0	e16	e60	1470	255	58	79	113	52
20	76	63	30	e8.1	e17	e62	1340	245	58	84	114	50
21	67	55	e26	e8.2	e17	e68	1210	233	60	83	114	45
22	57	e53	e23	e8.4	e18	e80	1080	223	63	73	113	43
23	45	e59	e20	e8.6	e19	e90	972	217	58	64	98	43
24	43	e59	e17	e9.0	e20	140	877	211	110	60	88	44
25	39	e61	e16	e9.6	e21	153	794	206	325	295	77	44
26	38	e61	e15	e9.8	e22	518	725	203	237	767	67	46
27	36	e63	e14	e9.6	e24	1390	665	196	182	1310	59	45
28	38	e63	e13	e9.2	e26	1730	616	187	146	1370	54	42
29	51	e68	e12	e9.0	---	2110	574	181	132	972	51	40
30	215	e73	e12	e9.0	---	5290	535	179	140	727	56	38
31	254	---	e12	e9.0	---	8680	---	178	---	584	61	---
TOTAL	1409	2809	1892	299.9	401.6	21072	91748	10336	3550	7949	5690	1662
MEAN	45.5	93.6	61.0	9.67	14.3	680	3058	333	118	256	184	55.4
MAX	254	253	108	13	26	8680	7980	621	325	1370	481	132
MIN	15	53	12	7.8	9.2	28	535	178	57	53	51	38
AC-FT	2790	5570	3750	595	797	41800	182000	20500	7040	15770	11290	3300
CFSM	.07	.14	.09	.01	.02	1.04	4.68	.51	.18	.39	.28	.08
IN.	.08	.16	.11	.02	.02	1.20	5.23	.59	.20	.45	.32	.09

e Estimated

MINNESOTA RIVER BASIN

05313500 YELLOW MEDICINE RIVER NEAR GRANITE FALLS, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1997, BY WATER YEAR (WY)

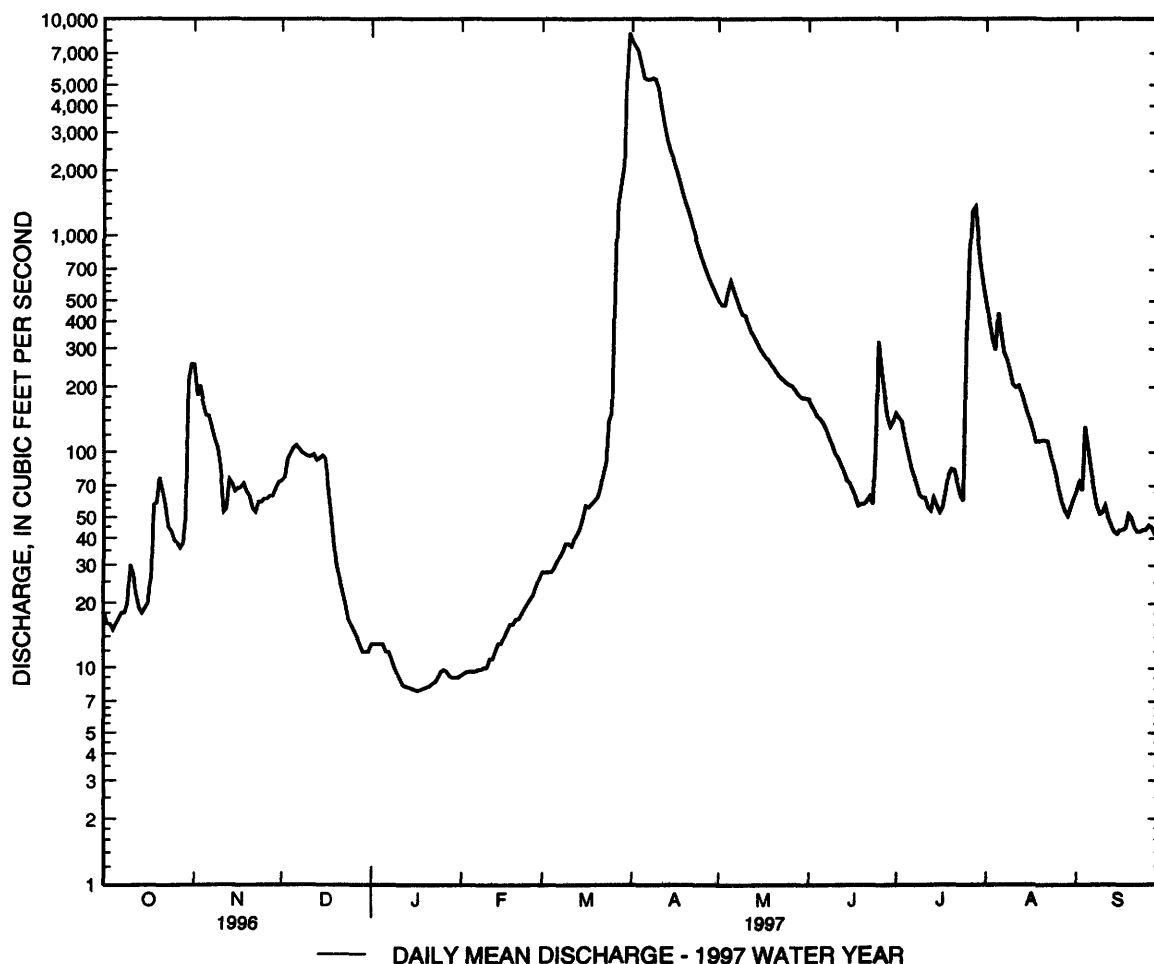
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	43.7	46.3	28.3	13.5	16.8	226	500	202	280	141	71.0	43.6
MAX	561	392	256	88.3	97.1	933	3302	1087	2484	1600	510	1005
(WY)	1996	1996	1996	1996	1966	1986	1969	1944	1984	1993	1953	1986
MIN	1.41	1.60	1.39	.90	.13	3.67	2.58	1.18	1.18	.34	.38	.47
(WY)	1937	1938	1936	1948	1959	1975	1934	1934	1934	1933	1934	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1931 - 1997	
ANNUAL TOTAL	67812		148818.5			
ANNUAL MEAN	185		408		144 _a	
HIGHEST ANNUAL MEAN					566	
LOWEST ANNUAL MEAN					8.32	
HIGHEST DAILY MEAN	1280		May 30		16400	
LOWEST DAILY MEAN	12		Sep 16		.00 _b	
ANNUAL SEVEN-DAY MINIMUM	13		Sep 12		.00	
INSTANTANEOUS PEAK FLOW			9020		17200	
INSTANTANEOUS PEAK STAGE			11.80		14.90	
INSTANTANEOUS LOW FLOW			7.8 _c		.00 _b	
ANNUAL RUNOFF (AC-FT)	134500		295200		104000	
ANNUAL RUNOFF (CFSM)	.28		.62		.22	
ANNUAL RUNOFF (INCHES)	3.86		8.48		2.99	
10 PERCENT EXCEEDS	524		689		315	
50 PERCENT EXCEEDS	96		67		19	
90 PERCENT EXCEEDS	18		12		2.3	

a Median of annual mean discharges is 86.4 ft³/s.

b Many days, several years.

c Minimum daily, backwater from ice.



MINNESOTA RIVER BASIN

05315000 REDWOOD RIVER NEAR MARSHALL, MN

LOCATION.--Lat 44°25'49", long 95°50'43", in SE 1/4 SW 1/4 sec. 12, T.111 N., R.42 W., Lyon County, Hydrologic Unit 07020006, on right bank 2.0 mi upstream from Redwood River diversion structure on southwest edge of town of Marshall, MN. Prior to Apr. 10, 1980, at site 5 mi downstream.

DRAINAGE AREA.--259 mi².

PERIOD OF RECORD.--March 1940 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WDR MN-89-2: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,188.23 ft above mean sea level. March 1940 to April 9, 1980, nonrecording gage 5.0 mi downstream from present site at datum 43.35 ft lower (crest-stage gage added June 12, 1968). Since March 1964, nonrecording gage and crest-stage gage on diversion channel 1.5 mi downstream at datum 1,100.00 ft above sea level.

REMARKS.--Records good except those for estimated daily discharges which are fair to poor. Water diverted at medium and high stages into diversion channel 2.0 mi below station. Diversion began Mar. 18, 1964. Unknown amount of natural diversion into Cottonwood River basin occurs at extremely high stages 0.8 mi below station.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	e66	e16	e14	e15	e15	1760	300	80	142	108	20
2	13	e62	e15	e15	e15	e16	1770	349	85	116	99	20
3	12	e66	e15	e17	e14	e16	1640	456	85	101	136	18
4	14	e63	e14	e17	e14	e16	1490	399	84	89	138	17
5	15	e60	e14	e17	e13	e15	e1510	365	76	82	109	16
6	15	e54	e14	e17	e13	e15	e1490	321	67	77	101	16
7	15	e50	e14	e17	e13	e15	e1450	312	65	75	95	15
8	16	e44	e13	e16	e14	e16	e1410	329	68	e70	86	16
9	16	e37	e13	e16	e14	e16	e1380	306	59	e68	86	16
10	14	e32	e13	e16	e14	e17	1310	264	56	e66	113	14
11	14	e26	e13	e16	e14	e17	1140	246	51	e62	103	14
12	e15	e30	e13	e16	e13	e18	1060	227	48	e60	90	13
13	e16	32	e13	e16	e13	e19	966	212	47	e58	81	13
14	e16	60	e13	e16	e12	e21	900	192	42	e56	74	12
15	e20	87	e13	e16	e12	e23	895	177	40	e55	69	14
16	e40	80	e13	e16	e12	e27	828	170	37	e53	63	15
17	e60	46	e13	e15	e12	e60	755	149	36	e51	57	16
18	e66	43	e13	e16	e13	e36	705	162	34	e55	52	16
19	e60	e39	e12	e16	e13	e42	655	136	38	e54	50	13
20	e48	e36	e12	e16	11	e50	598	124	41	e51	49	12
21	e41	e32	e11	e16	e13	e59	565	118	42	e50	45	12
22	e36	e29	e11	e16	e13	e70	520	103	59	e50	41	13
23	e33	e25	e11	e16	e13	e86	493	101	111	e65	37	17
24	e32	e23	e10	e16	e13	e110	446	101	93	e100	35	19
25	e31	e20	e10	e15	e13	e150	428	100	84	e200	32	19
26	e30	e18	e9.6	e15	e14	189	409	96	74	277	29	20
27	e28	e18	e9.8	e15	e14	517	385	91	67	218	27	19
28	e29	e17	e10	e15	e15	1680	359	90	61	178	25	19
29	e32	e17	e11	e14	---	2670	332	90	90	148	23	18
30	e70	e16	e12	e15	---	2580	331	91	172	126	23	18
31	e78	---	e13	e15	---	1890	---	85	---	111	22	---
TOTAL	937	1228	387.4	489	372	10471	27980	6262	1992	2964	2098	480
MEAN	30.2	40.9	12.5	15.8	13.3	338	933	202	66.4	95.6	67.7	16.0
MAX	78	87	16	17	15	2670	1770	456	172	277	138	20
MIN	12	16	9.6	14	11	15	331	85	34	50	22	12
AC-FT	1860	2440	768	970	738	20770	55500	12420	3950	5880	4160	952
CFSM	.12	.16	.05	.06	.05	1.30	3.60	.78	.26	.37	.26	.06

e Estimated

MINNESOTA RIVER BASIN

05315000 REDWOOD RIVER NEAR MARSHALL, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 1997, BY WATER YEAR (WY)

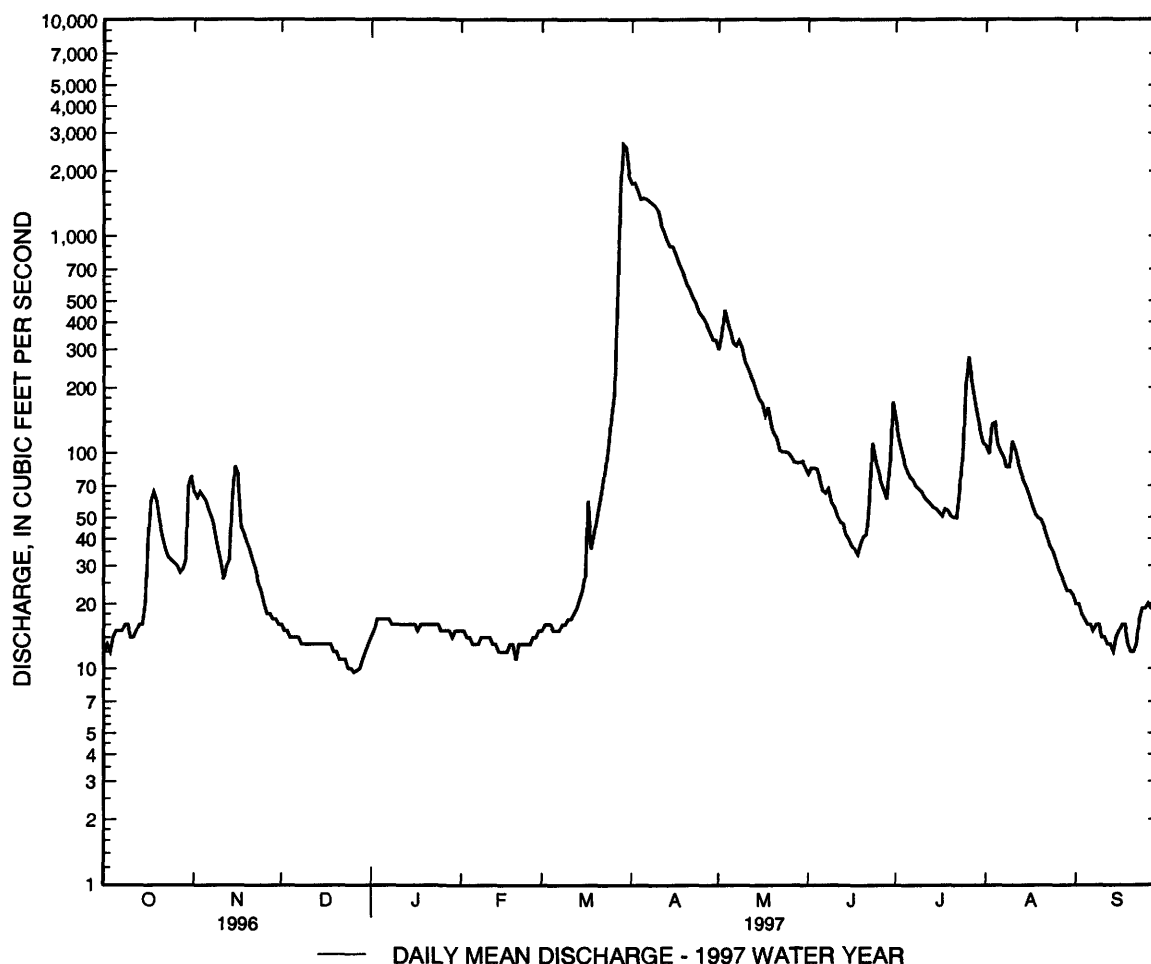
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	28.2	26.1	14.3	8.50	14.9	125	230	123	118	70.3	35.3	26.6
MAX	310	202	82.3	59.4	101	571	1152	1205	936	1161	610	292
(WY)	1996	1996	1994	1994	1983	1983	1969	1993	1993	1993	1993	1986
MIN	.029	.58	.87	.000	.090	2.70	7.36	3.90	.83	.058	.042	.007
(WY)	1977	1977	1977	1977	1979	1965	1990	1981	1976	1976	1941	1941

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1940 - 1997	
ANNUAL TOTAL	29073.9		55660.4			
ANNUAL MEAN	79.4		152		68.9 ^a	
HIGHEST ANNUAL MEAN					421	
LOWEST ANNUAL MEAN					5.13	
HIGHEST DAILY MEAN	490		May 28		5300	
LOWEST DAILY MEAN	9.1		Sep 18		May 9	
ANNUAL SEVEN-DAY MINIMUM	9.9		Sep 12		Jul 28	
INSTANTANEOUS PEAK FLOW			2670		Mar 29	
INSTANTANEOUS PEAK STAGE			9.6 ^b		Dec 26	
INSTANTANEOUS LOW FLOW			10		Dec 22	
10 PERCENT EXCEEDS	186		3310		Mar 30	
50 PERCENT EXCEEDS	40		15.82		Mar 30	
90 PERCENT EXCEEDS	12		9.6 ^b		Dec 26	
					6380	
					17.00	
					.00	
					.00	
					160	
					12	
					1.9	

a Median of annual mean discharges is 43.5 ft³/s.

b Result of freezeup.

c Many days, several years.



MINNESOTA RIVER BASIN

05316500 REDWOOD RIVER NEAR REDWOOD FALLS, MN

LOCATION.--Lat 44°31'25", long 95°10'20", in SE 1/4 NE 1/4 sec. 9, T.112 N., R.36 W., Redwood County, Hydrologic Unit 07020006, on right bank 4 ft upstream from highway bridge, 3 mi west of town of Redwood Falls, and 8.5 mi upstream from mouth.

DRAINAGE AREA.--629 mi².

PERIOD OF RECORD.--July 1909 to September 1914 (no winter records except 1911-12). August 1930 to September 1935 (no winter records), October 1935 to current year.

REVISED RECORDS.--WDR MN-89-2: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 972.33 ft above sea level. July 1909 to September 1914, nonrecording gage at bridge 20 ft downstream at datum 0.22 ft lower. August 1930 to Oct. 25, 1949, nonrecording gage, at bridge 20 ft downstream at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Natural discharge affected by unknown amount of interbasin flow between Yellow Medicine, Redwood, and Cottonwood River basins during extreme floods.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 29	1600	---	*a18.01	July 01	1700	409	3.67
Mar. 30	---	*b7200	b11.84	July 26	0900	1170	4.70

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	77	e82	81	e46	e50	5730	623	227	386	385	63
2	26	65	e80	71	e45	e51	4970	606	218	376	341	67
3	26	75	e77	61	e43	e52	4380	640	210	315	291	108
4	22	80	e74	73	e42	e53	4000	694	207	272	277	84
5	23	65	e70	69	e41	e54	3780	715	201	232	292	78
6	24	61	e72	39	e41	e56	4140	678	191	205	268	72
7	26	58	e74	e51	e40	e58	3900	645	179	190	245	64
8	25	55	e75	e50	e40	e60	3840	614	168	186	222	58
9	24	52	e76	e49	e40	e59	3800	579	157	176	205	55
10	26	41	e77	e49	e40	e60	3910	541	145	163	202	57
11	26	30	e76	e48	e40	e63	2870	505	137	149	216	52
12	26	36	e74	e46	e40	e65	2320	483	130	136	217	48
13	28	41	e72	e44	e40	e66	1990	455	119	132	197	47
14	29	37	e70	e41	e40	e67	1780	430	111	128	178	47
15	27	45	e60	e40	e40	e69	1630	405	105	123	163	46
16	28	62	e46	e40	e40	e69	1500	388	100	109	147	50
17	40	76	e44	e40	e40	e71	1400	369	96	110	135	55
18	69	78	e43	e40	e41	e80	1320	355	90	106	122	56
19	72	67	e42	e42	e43	e90	1240	332	89	127	122	47
20	61	64	e40	e45	e48	e100	1160	307	97	112	138	45
21	54	61	e38	e46	e49	e120	1090	289	97	98	177	42
22	46	57	e34	e45	e49	e150	1010	280	92	107	132	42
23	43	59	e31	e44	e48	e200	948	272	90	109	114	44
24	40	56	e28	e43	e45	e300	885	272	223	115	103	56
25	38	57	26	e42	e50	e450	826	265	301	731	94	53
26	37	59	25	e41	e50	e700	777	255	305	1130	86	49
27	37	64	27	e41	e50	e1500	741	243	264	934	80	45
28	33	70	29	e40	e50	e7090	706	238	227	769	73	44
29	35	76	33	e40	---	e7100	673	241	241	637	69	42
30	e75	83	36	e43	---	e7200	652	237	308	530	74	39
31	e91	---	45	e47	---	6510	---	233	---	445	67	---
TOTAL	1185	1807	1676	1491	1221	32613	67968	13189	5125	9338	5436	1655
MEAN	38.2	60.2	54.1	48.1	43.6	1052	2266	425	171	301	175	55.2
MAX	91	83	82	81	50	7200	5730	715	308	1130	389	108
MIN	22	30	25	39	40	50	652	233	89	98	67	39
AC-FT	2350	3580	3320	2960	2420	64690	134800	26160	10170	18520	10780	3280
CFSM	.06	.10	.09	.08	.07	1.67	3.60	.68	.27	.48	.28	.09
IN.	.07	.11	.10	.09	.07	1.93	4.02	.78	.30	.55	.32	.10

a Result of ice jam.

b Maximum daily, backwater from ice.

c Estimated

MINNESOTA RIVER BASIN

05316500 REDWOOD RIVER NEAR REDWOOD FALLS, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	57.4	59.8	34.3	16.7	20.9	243	435	220	259	149	79.7	52.2
MAX	509	541	245	104	167	1289	2880	1530	2724	1994	934	673
(WY)	1996	1980	1983	1994	1983	1983	1969	1993	1993	1993	1993	1986
MIN	.84	.96	.46	.19	.20	1.54	14.6	2.75	1.01	.44	.51	.31
(WY)	1937	1936	1936	1940	1937	1965	1934	1934	1934	1934	1934	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1909 - 1997
ANNUAL TOTAL	67735	142704	
ANNUAL MEAN	185	391	150 ^a
HIGHEST ANNUAL MEAN			789
LOWEST ANNUAL MEAN			10.8
HIGHEST DAILY MEAN	969	May 29	13200
LOWEST DAILY MEAN	22	Sep 17	.00 ^c
ANNUAL SEVEN-DAY MINIMUM	24	Sep 14	.01
INSTANTANEOUS PEAK FLOW		7200 ^b	19700
INSTANTANEOUS PEAK STAGE		18.01 ^d	18.01 ^d
INSTANTANEOUS LOW FLOW		20 ^e	.00
ANNUAL RUNOFF (AC-FT)	134400	283100	108800
ANNUAL RUNOFF (INCHES)	4.01	8.44	3.24
10 PERCENT EXCEEDS	477	721	320
50 PERCENT EXCEEDS	80	75	27
90 PERCENT EXCEEDS	28	40	2.2

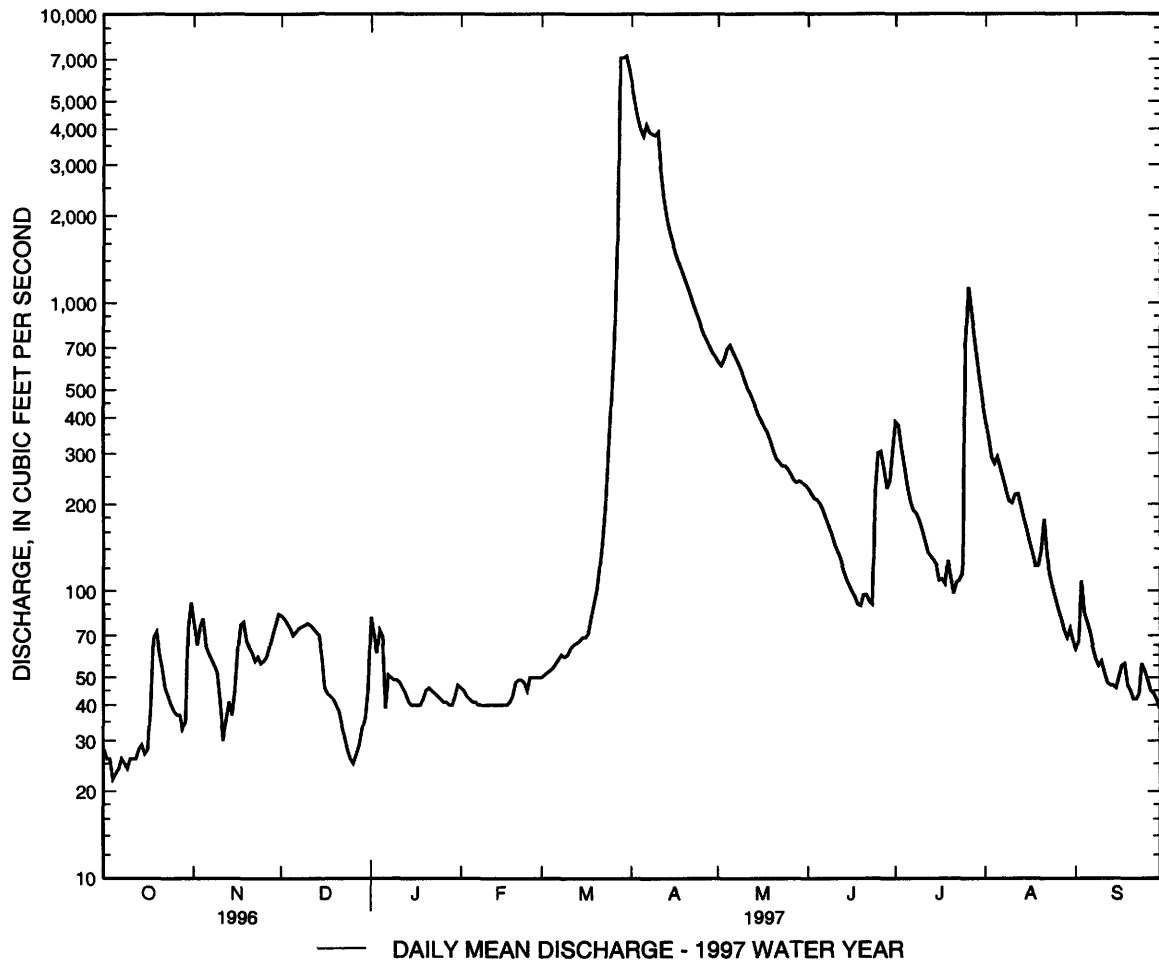
a Median of annual mean discharges is 97.1 ft³/s.

b Estimated daily discharge, backwater from ice.

c Many days in 1940 and 1959.

d Result of ice jam.

e Result of temporary storage.



MINNESOTA RIVER BASIN

05317000 COTTONWOOD RIVER NEAR NEW ULM, MN

LOCATION.--Lat 44°17'29", long 94°26'24", in SW 1/4 NE 1/4 sec. 33, T.110 N., R.30 W., Brown County, Hydrologic Unit 07020008, on left bank 600 ft upstream from highway bridge, 1.8 mi south of New Ulm, and 3.2 mi upstream from mouth.

DRAINAGE AREA.--1,280 mi² (approximately).

PERIOD OF RECORD.--July 1909 to December 1913, March 1931 to March 1938, August 1938 to current year (winter records incomplete prior to 1936).

REVISED RECORDS.--WSP 355: 1912.

GAGE.--Water-stage recorder. Datum of gage is 796.83 ft above mean sea level. July 1, 1909 to Dec. 13, 1913, nonrecording gage at site 2.7 mi upstream at different datum. Mar. 15, 1931 to Mar. 31, 1938, nonrecording gage 2.2 mi upstream at datum 11.41 ft higher. Aug. 23, 1938 to June 25, 1948, nonrecording gage at present site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 30	1500	*13,800	*16.03	July 02	0300	3330	10.45
May 05	1700	1390	7.28	July 27	1000	5520	12.12
June 27	0500	1980	8.34				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	116	202	e370	e149	e170	e250	8260	918	572	2940	1560	270
2	112	203	e365	e151	e171	e265	6720	904	555	3210	1370	248
3	104	212	e360	e160	e170	e280	5900	929	531	2510	1200	234
4	101	239	e359	e168	e170	e279	5480	1080	512	1870	1050	227
5	99	253	e352	e170	e170	e270	5240	1340	495	1500	961	220
6	98	243	e350	e172	e169	e240	5600	1370	479	1250	938	211
7	97	232	e350	e172	e168	e230	6570	1280	460	1070	846	200
8	96	224	e350	e171	e167	e240	6840	1200	444	930	758	188
9	97	218	e345	e170	e166	e280	6720	1130	421	833	680	182
10	96	210	e341	e169	e165	e350	5890	1050	405	786	635	178
11	94	180	e340	e168	e165	e640	5340	986	389	707	610	172
12	94	151	e330	e165	e163	e960	4630	940	371	631	600	171
13	94	129	e320	e162	e162	e1020	3790	890	347	591	594	163
14	93	173	e301	e161	e162	e1010	3220	851	332	596	558	157
15	94	225	e280	e160	e160	e1000	2800	808	319	792	520	156
16	113	267	e265	e160	e160	e1050	2480	759	303	778	480	157
17	248	424	e245	e160	e160	e1100	2200	723	291	674	435	145
18	200	719	e225	e159	e159	e1200	2010	696	279	641	395	143
19	241	747	e205	e159	e164	e1400	1860	682	279	684	386	145
20	251	712	e190	e160	e172	1910	1710	661	276	595	385	142
21	243	541	e175	e160	e180	3310	1590	625	276	513	889	137
22	219	436	e160	e162	e172	4220	1480	593	267	732	882	136
23	233	e415	e149	e170	e171	5280	1390	572	261	1010	690	141
24	222	e390	e140	e173	e171	6280	1310	575	408	858	565	138
25	209	e355	e138	e170	e176	6690	1210	579	1260	1410	475	142
26	205	e335	e135	e162	e183	8000	1130	579	1820	4310	400	148
27	195	e335	e134	e169	e200	9290	1060	585	1860	5330	362	153
28	183	e340	e134	e165	e220	10500	1010	579	1400	4110	324	152
29	181	e360	e138	e165	---	11700	968	575	1300	3070	296	143
30	188	e355	e140	e165	---	13500	941	575	1570	2420	290	132
31	195	---	e142	e170	---	11100	---	575	---	1920	275	---
TOTAL	4811	9825	7828	5097	4786	103844	105349	25609	18482	49271	20435	5131
MEAN	155	328	253	164	171	3350	3512	826	616	1589	650	171
MAX	251	747	370	173	220	13500	8260	1370	1860	5330	1560	270
MIN	93	129	134	149	159	230	941	572	261	513	275	132
AC-FT	9540	19490	15530	10110	9490	206000	209000	50800	36660	97730	40530	10180
CFSM	.12	.26	.20	.13	.13	2.62	2.74	.65	.48	1.24	.51	.13

e Estimated

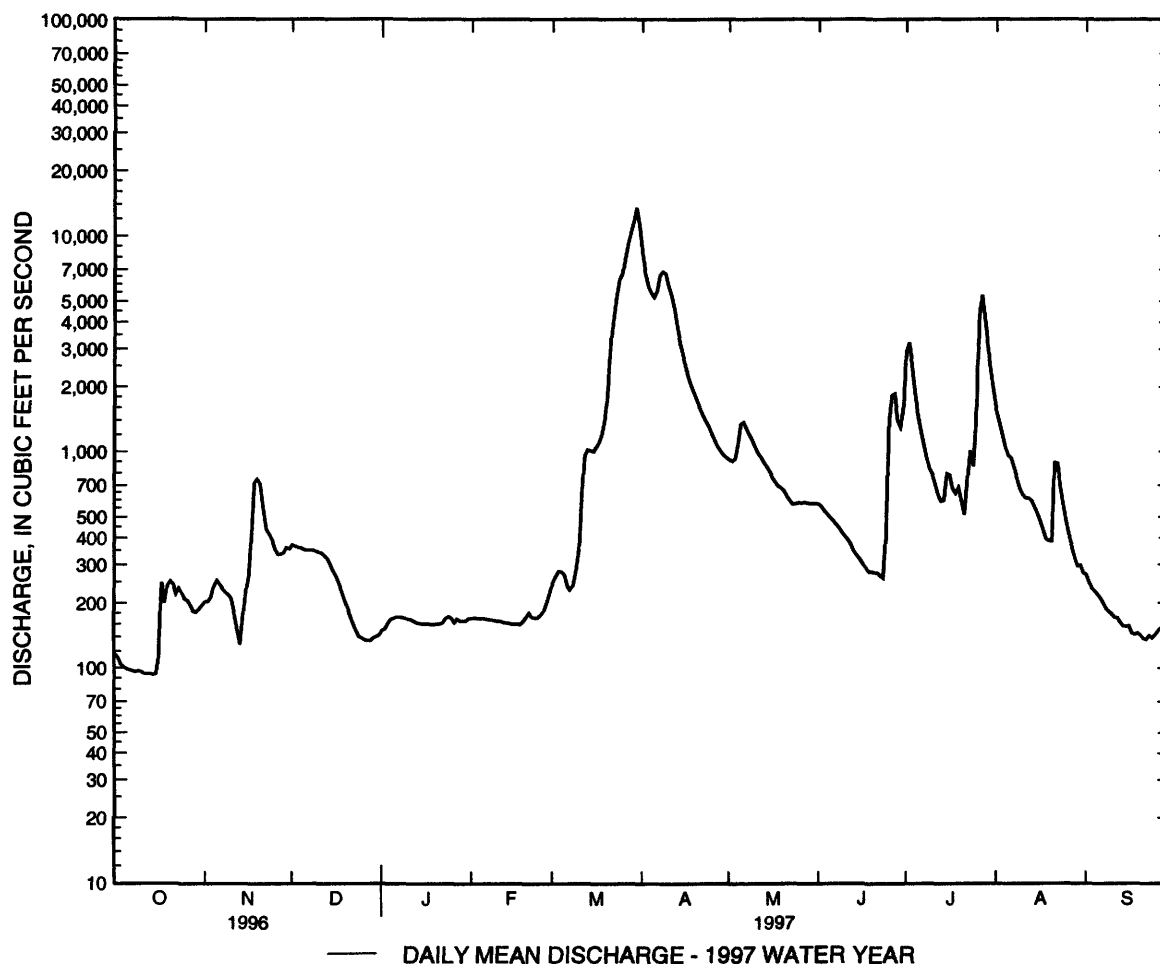
MINNESOTA RIVER BASIN

05317000 COTTONWOOD RIVER NEAR NEW ULM, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	179	159	105	55.9	95.4	662	1008	577	618	365	193	156
MAX	3208	1099	572	282	628	3350	7075	3497	5831	3815	1791	2438
(WY)	1969	1980	1980	1992	1983	1997	1969	1993	1993	1993	1993	1986
MIN	4.57	7.97	5.77	1.61	1.47	13.9	40.0	7.57	8.58	4.37	1.05	3.28
(WY)	1934	1940	1936	1940	1940	1965	1959	1934	1911	1934	1934	1933

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1909 - 1997
ANNUAL TOTAL	192982	360468	
ANNUAL MEAN	527	988	376a
HIGHEST ANNUAL MEAN			1796
LOWEST ANNUAL MEAN			41.1
HIGHEST DAILY MEAN	6440	Jun 19	13500
LOWEST DAILY MEAN	83	Feb 1	93
ANNUAL SEVEN-DAY MINIMUM	84	Jan 29	95
INSTANTANEOUS PEAK FLOW			13800
INSTANTANEOUS PEAK STAGE			16.03
INSTANTANEOUS LOW FLOW			92
ANNUAL RUNOFF (AC-FT)	382800	715000	272200
10 PERCENT EXCEEDS	1080	2090	846
50 PERCENT EXCEEDS	285	340	80
90 PERCENT EXCEEDS	109	147	11

a Median of annual mean discharges is 237 ft³/s.

MINNESOTA RIVER BASIN

05317200 LITTLE COTTONWOOD RIVER NEAR COURTLAND, MN

LOCATION.--Lat 44°14'47", long 94°20'19", in SW1/4,NE1/4, sec.17, T.109 N., R.29 W., Blue Earth County, Hydrologic Unit 07020007, on right bank 30 ft downstream from bridge on State Highway 68, 0.7 mi above mouth, 1.5 mi south of Courtland.

DRAINAGE AREA.--230 mi², approximately.

PERIOD OF RECORD.--October 1973 to current year. September 1969 to September 1973, operated as a low-flow station only.

GAGE.--Water-stage recorder. Datum of gage is 788.25 ft above mean sea level.

REMARKS.--Records fair except those for estimated days, which are poor.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 180 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 15	0400	255	5.05	May 07	2100	196	4.82
Nov. 20	1900	183	4.56	June 30	0200	319	5.41
Nov. 22	2200	215	4.79	July 07	2200	310	5.35
Mar. 12	2300	388	5.66	July 14	1300	228	4.84
Mar. 21	2100	*892	*7.55	July 22	1900	279	5.13
Apr. 18	--	a320	--	July 25	1200	287	5.18

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	66	e101	e31	e25	42	e375	116	132	242	132	44
2	21	64	e99	e31	e26	49	e350	121	124	221	117	46
3	21	60	e94	e32	26	54	e310	135	118	225	103	41
4	20	60	e86	e33	27	64	e270	141	112	243	90	36
5	19	57	e81	e34	27	e62	e290	148	105	272	77	34
6	19	55	e75	e33	27	e56	e300	152	99	298	90	34
7	21	52	e71	e33	27	e55	e270	167	93	305	82	32
8	18	44	e59	e33	e27	e61	e250	170	84	283	75	29
9	18	26	e56	e32	e27	71	e220	139	77	238	66	27
10	18	30	e53	e32	28	139	e200	133	72	200	58	27
11	18	45	e51	e31	e28	249	e180	125	68	174	58	27
12	18	38	e51	e30	e28	362	e170	120	66	156	61	26
13	20	50	e50	e30	e28	350	e190	112	63	157	55	22
14	16	136	e45	e30	29	e290	e210	108	57	214	55	22
15	16	e224	e36	e29	29	e280	e230	104	53	177	51	21
16	19	164	e47	e29	30	e285	e250	98	49	148	45	23
17	92	146	e54	e28	30	334	e265	92	47	144	42	24
18	115	e145	e45	e28	31	387	e320	92	45	143	38	22
19	97	128	e40	e27	30	447	e300	87	46	146	42	20
20	91	134	e38	e27	28	543	301	84	45	135	47	19
21	82	147	e35	e26	30	e808	243	79	44	195	78	18
22	75	e152	e34	e27	e32	892	212	75	39	236	110	19
23	78	e154	e33	e27	e33	780	198	72	35	236	108	21
24	91	e156	e32	e27	e34	788	186	87	35	202	104	21
25	87	e142	e32	e26	e35	792	180	95	75	262	88	22
26	81	e120	e32	e26	37	792	171	103	92	251	74	22
27	74	e109	e31	e25	38	813	143	109	93	229	64	21
28	67	e97	e31	e25	40	731	133	112	109	213	56	19
29	66	e97	e31	e25	---	618	127	124	230	194	51	17
30	72	e99	e31	e25	---	e520	121	141	299	171	55	17
31	71	---	e31	e25	---	e450	---	138	---	149	49	---
TOTAL	1544	2997	1585	897	837	12164	6965	3579	2606	6459	2221	773
MEAN	49.8	99.9	51.1	28.9	29.9	392	232	115	86.9	208	71.6	25.8
MAX	115	224	101	34	40	892	375	170	299	305	132	46
MIN	16	26	31	25	25	42	121	72	35	135	38	17
AC-FT	3060	5940	3140	1780	1660	24130	13820	7100	5170	12810	4410	1530
CFM	.22	.43	.22	.13	.13	1.71	1.01	.50	.38	.91	.31	.11
IN.	.25	.48	.26	.15	.14	1.97	1.13	.58	.42	1.04	.36	.13

a Estimated daily discharge, backwater from Minnesota River.

e Estimated

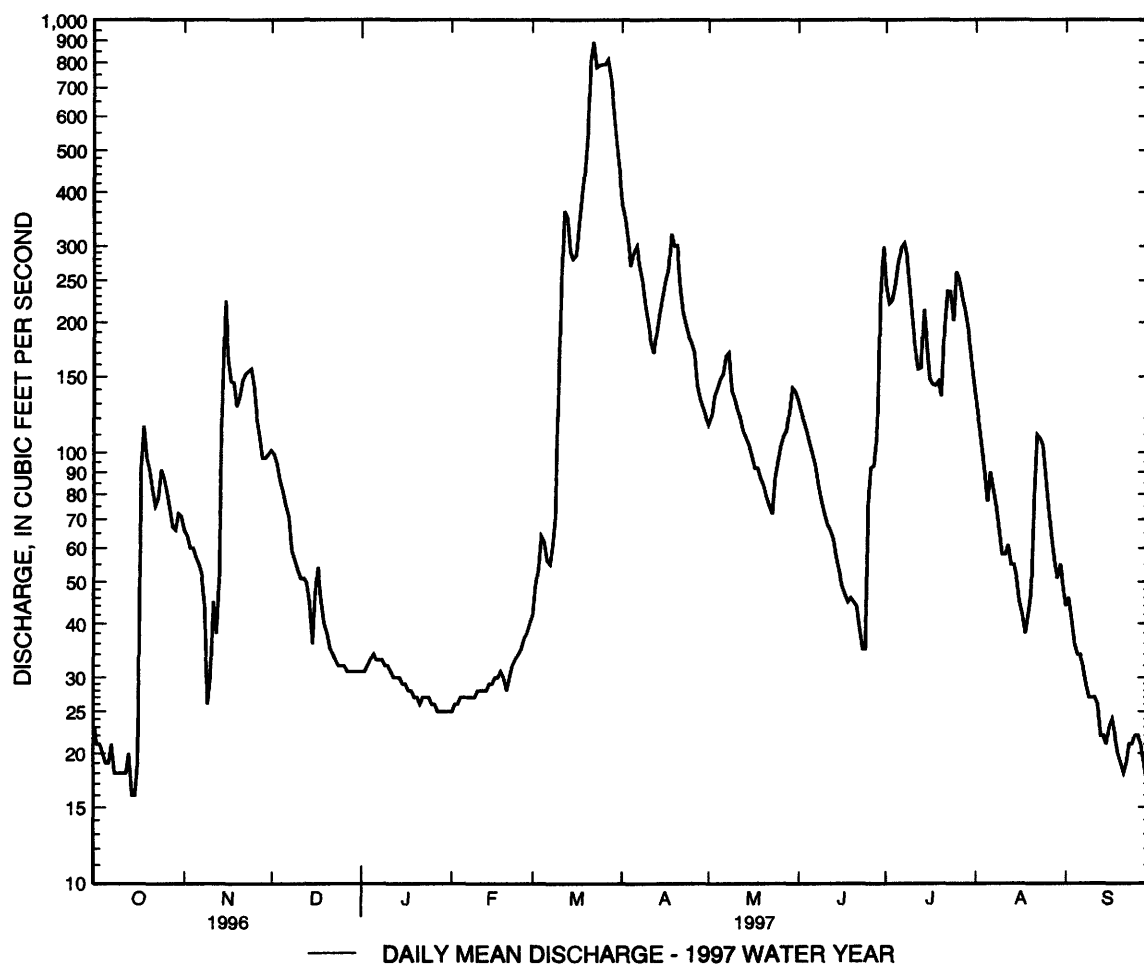
MINNESOTA RIVER BASIN

05317200 LITTLE COTTONWOOD RIVER NEAR COURTLAND, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	44.1	49.1	28.6	15.5	22.6	134	168	122	137	91.1	56.6	45.1
MAX	163	134	118	80.1	105	392	463	418	750	553	248	262
(WY)	1987	1983	1992	1992	1983	1997	1983	1993	1993	1993	1993	1986
MIN	.75	.70	.21	.15	.38	5.79	9.64	4.17	2.39	.63	.81	.54
(WY)	1976	1977	1977	1977	1977	1975	1990	1981	1976	1988	1976	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1974 - 1997
ANNUAL TOTAL	38942	42627	
ANNUAL MEAN	106	117	76.3
HIGHEST ANNUAL MEAN			239
LOWEST ANNUAL MEAN			9.18
HIGHEST DAILY MEAN	1470	892	2850
LOWEST DAILY MEAN	12	16	.02
ANNUAL SEVEN-DAY MINIMUM	14	18	.08
INSTANTANEOUS PEAK FLOW		892	3520
INSTANTANEOUS PEAK STAGE		7.55	10.45
INSTANTANEOUS LOW FLOW		14	.01
ANNUAL RUNOFF (AC-FT)	77240	84550	55260
ANNUAL RUNOFF (CFMS)	.46	.51	.33
ANNUAL RUNOFF (INCHES)	6.30	6.89	4.51
10 PERCENT EXCEEDS	210	263	200
50 PERCENT EXCEEDS	74	68	28
90 PERCENT EXCEEDS	22	25	1.3



MINNESOTA RIVER BASIN

05319500 WATONWAN RIVER NEAR GARDEN CITY, MN

LOCATION.--Lat 44°02'47", long 94°11'43", in SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 28, T.107 N., R.28 W., Blue Earth County, Hydrologic Unit 07020010, on left bank 25 ft downstream from bridge on County Highway 13, 1.5 miles west of Garden City, 7.3 mi upstream from mouth, and 9.2 mi downstream from Perch Creek.

DRAINAGE AREA.--812 mi².

PERIOD OF RECORD.--March 1940 to September 1945, September 1976 to current year. 1953, 1960, 1961, and 1969 (one or more discharge measurements each year).

REVISED RECORDS.--WDR MN-78-2: 1977.

GAGE.--Water-stage recorder. Datum of gage is 905.05 ft above mean sea level. Prior to September 30, 1945, nonrecording gage at site 700 ft upstream and at datum 0.17 ft higher.

REMARKS.--Records good except those for the periods of estimated daily discharge, which are fair to poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 7, 1965, reached a stage of 18.89 ft at datum 0.17 ft higher, from floodmarks, discharge, 19,000 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 900 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 19	1700	1610	4.76	June 25	2200	1960	5.33
Mar. 14	0100	--	*a8.72	July 03	1600	2310	6.14
Mar. 24	1900	*3310	a7.22	July 11	0300	1410	4.63
Apr. 08	0700	2150	5.47	July 25	0400	2420	6.32
May 26	1500	1460	a4.51				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	148	422	e620	e240	e172	e270	2210	563	e1190	2020	90 ^a	353
2	139	372	e610	e250	e178	e310	1940	548	1070	2110	77 ^c	312
3	123	344	e600	e252	e170	e370	1770	573	968	2270	66 ^c	270
4	118	339	e595	e250	e165	e390	1640	697	879	2130	59 ^c	233
5	114	353	e590	e245	e161	e385	1580	807	811	1730	53 ^c	211
6	109	341	e560	e235	e159	e375	1820	824	753	1340	50 ^c	192
7	101	330	e530	e220	e158	e355	2100	753	e667	1090	48 ^c	177
8	98	316	e490	e215	e153	e360	2130	726	e634	1040	44 ^c	165
9	98	299	e490	e208	e151	e500	1890	784	e580	1290	38 ^c	154
10	97	276	e480	e210	e148	e800	1610	779	e544	1360	36 ^c	155
11	92	242	e470	e203	e148	e1100	1470	711	e506	1360	34 ^c	144
12	92	166	e450	e202	e141	e1500	1330	671	e459	1220	32 ^c	136
13	91	210	e405	e192	e140	e1800	1240	630	416	1080	30 ^c	124
14	88	239	e360	e190	e139	e1880	1160	585	395	1200	28 ^c	116
15	83	257	e325	e190	e141	e1880	1090	554	367	1310	29 ^c	110
16	80	296	e305	e189	e137	e1870	1040	e527	345	1150	29 ^c	110
17	94	752	e303	e191	e132	e2000	978	537	322	1010	25 ^c	108
18	238	1360	e290	e190	e136	e2300	924	e500	296	976	23 ^c	103
19	486	1580	e285	e187	e140	e2600	904	e492	292	893	21 ^c	96
20	573	1550	e280	e180	e142	e2850	876	464	289	771	32 ^c	92
21	540	1350	e270	e178	e141	e3100	842	442	293	1100	72 ^c	88
22	465	1140	e270	e179	e142	e3060	807	415	336	1940	72 ^c	85
23	427	983	e260	e180	e142	e3210	770	387	705	2260	60 ^c	92
24	456	838	e245	e180	e145	e3280	730	531	1640	2350	49 ^c	104
25	519	658	e240	e180	e150	e3210	685	1210	1910	2390	40 ^c	106
26	514	e630	e235	e181	e160	e3080	654	e1460	1940	2300	33 ^c	106
27	473	e630	e230	e179	e185	e2980	631	e1400	1810	2170	29 ^c	103
28	428	e635	e235	e175	e220	e2980	617	e1260	1560	1970	25 ^c	96
29	396	e640	e235	e170	---	e2920	591	e1220	1440	1620	22 ^c	91
30	398	e630	e236	e169	---	2830	572	e1290	1730	1300	25 ^c	88
31	434	---	e239	e170	---	2500	---	e1300	---	1070	37 ^c	---
TOTAL	8112	18178	11733	6180	4296	57045	36601	23640	25147	47820	1323 ^c	4320
MEAN	262	606	378	199	153	1840	1220	763	838	1543	42 ^c	144
MAX	573	1580	620	252	220	3280	2210	1460	1940	2390	90 ^a	353
MIN	80	166	230	169	132	270	572	387	289	771	218	85
AC-FT	16090	36060	23270	12260	8520	113100	72600	46890	49880	94850	2625 ^c	8570
CFSM	.32	.75	.47	.25	.19	2.27	1.50	.94	1.03	1.90	.53	.18

a Gage height is approximate.

c Estimated

MINNESOTA RIVER BASIN

05319500 WATONWAN RIVER NEAR GARDEN CITY, MN--Continued

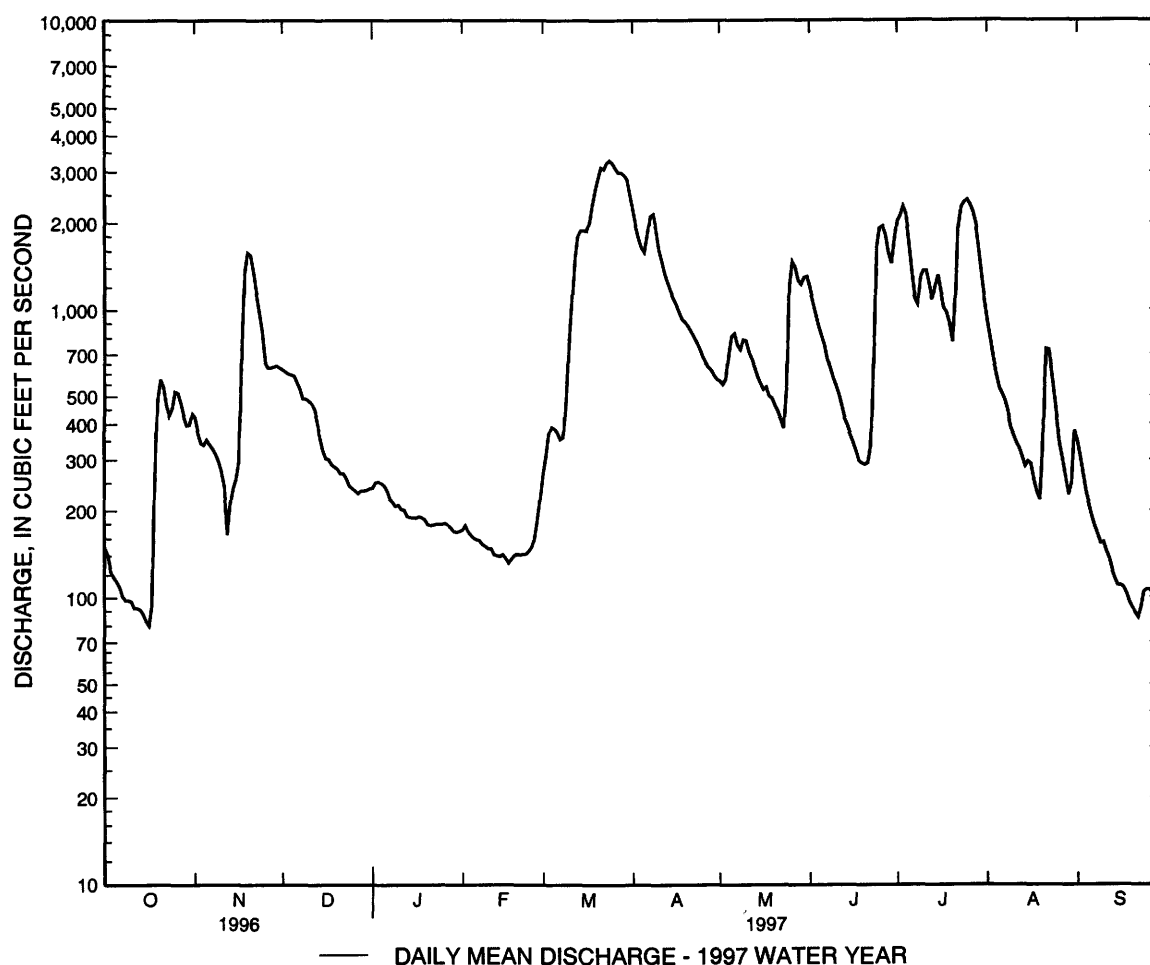
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	207	254	152	74.4	105	627	864	619	896	481	260	212
MAX	686	826	530	319	626	2105	2696	2025	4494	2389	1095	819
(WY)	1993	1993	1992	1992	1983	1992	1993	1993	1993	1993	1979	1993
MIN	5.37	7.69	3.76	2.70	2.39	19.3	33.7	16.1	17.3	8.27	6.56	3.63
(WY)	1990	1977	1990	1977	1977	1940	1990	1940	1989	1940	1989	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1940 - 1997	
ANNUAL TOTAL	184337		256308		409	
ANNUAL MEAN	504		702		1330	
HIGHEST ANNUAL MEAN					43.7	
LOWEST ANNUAL MEAN					1.8	
HIGHEST DAILY MEAN	4670		3280		13400	
LOWEST DAILY MEAN	55		80		1.8	
ANNUAL SEVEN-DAY MINIMUM	57		89		1.9	
INSTANTANEOUS PEAK FLOW			3310 ^a		13900	
INSTANTANEOUS PEAK STAGE			8.72 ^b		15.91	
INSTANTANEOUS LOW FLOW			79		1.8	
ANNUAL RUNOFF (AC-FT)	365600		508400		296500	
ANNUAL RUNOFF (CFSM)	.62		.86		.50	
10 PERCENT EXCEEDS	952		1840		1100	
50 PERCENT EXCEEDS	372		422		146	
90 PERCENT EXCEEDS	88		137		12	

a Based on approximation of peak stage.

b Backwater from ice.



MINNESOTA RIVER BASIN

05320000 BLUE EARTH RIVER NEAR RAPIDAN, MN

LOCATION.--Lat 44°05'44", long 94°06'33", in SE 1/4, SE 1/4 sec. 6, T.107 N., R.27 W., Blue Earth County, Hydrologic Unit 07020009, on left bank 0.2 mi downstream from power plant (reactivated in 1984) operated by Rapidan Redevelopment Limited Partnership, 2 mi west of Rapidan, 3.5 mi downstream from Watonwan River, and 7.8 mi upstream from Le Sueur River.

DRAINAGE AREA.--2,430 mi², approximately.

PERIOD OF RECORD.--July 1909 to November 1910 (published as "at Rapidan Mills," no winter records), October 1939 to September 1945, July 1949 to current year.

REVISED RECORDS.--WSP 895: Drainage area. WSP 1508: 1910.

GAGE.--Water-stage recorder. Datum of gage is 807.83 ft above mean sea level. July 20, 1909 to Apr. 28, 1910, nonrecording gage at site 0.2 mi upstream at different datum. Apr. 29 to Nov. 12, 1910, nonrecording gage at site 800 ft upstream at different datum. Oct. 4 to Nov. 14, 1939, nonrecording gage at present site and datum.

REMARKS.--Records good except those for estimated periods, which are fair..

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	325	680	1890	551	337	1210	4740	1360	3660	4680	1810	546
2	265	657	1850	576	335	1250	4230	1390	3280	4440	1890	536
3	230	545	1790	538	330	1400	3980	1420	3080	4150	1250	420
4	239	575	1540	582	321	1590	3610	1630	2720	3910	1580	346
5	245	599	1540	601	317	1880	3540	2150	2570	3330	975	376
6	220	602	1510	579	317	2050	3780	2290	2370	2780	1060	318
7	203	590	1390	579	316	2030	4560	2200	2220	2320	1020	318
8	212	552	1260	567	302	1870	4890	2070	1940	2190	1060	315
9	206	518	1120	540	305	2150	4530	2230	1870	2580	737	272
10	183	525	1070	549	317	3030	3790	2550	1710	3160	669	247
11	183	468	1250	546	318	3560	3550	2410	1680	2940	690	312
12	178	311	1260	496	318	4240	3270	2260	1480	2430	646	272
13	175	235	1170	479	318	e4500	2920	2120	1380	2280	658	228
14	177	333	962	469	294	e5100	2900	1960	1360	2490	644	226
15	172	484	821	450	284	5140	2730	1820	1220	3090	558	224
16	175	602	630	e430	301	5170	2590	1690	1190	3000	602	225
17	188	1060	669	e420	300	5240	2380	1590	1070	2520	609	210
18	279	2140	e650	e400	360	5090	2310	1530	938	2430	453	179
19	527	2930	e620	397	293	4820	2240	1470	1080	2130	499	176
20	649	2970	e600	392	321	5120	2130	1400	954	1910	424	178
21	672	2610	e580	373	360	6090	2090	1390	981	2150	889	178
22	546	2220	e640	368	406	6960	2020	1200	876	3630	1470	178
23	613	1990	e510	367	442	8390	1950	1170	1410	3650	982	177
24	528	1540	e480	377	701	8350	1980	1460	2810	3750	905	178
25	637	1220	e460	377	884	7500	1560	2820	3560	3580	799	186
26	713	947	e430	370	986	6600	1590	3980	3770	3790	715	201
27	738	795	e460	366	1160	6340	1610	4220	3510	3780	647	202
28	694	1140	496	365	1170	6320	1550	3940	3080	3330	478	208
29	661	1660	493	361	---	6140	1510	3620	3660	3520	511	207
30	640	1840	579	387	---	5790	1410	3800	4140	2910	447	195
31	681	---	502	349	---	5290	---	3830	---	2440	565	---
TOTAL	12154	33338	29222	14201	12413	140210	85940	68970	65569	95290	26242	7834
MEAN	392	1111	943	458	443	4523	2865	2225	2186	3074	847	261
MAX	738	2970	1890	601	1170	8390	4890	4220	4140	4680	1890	546
MIN	172	235	430	349	284	1210	1410	1170	876	1910	424	176
AC-FT	24110	66130	57960	28170	24620	278100	170500	136800	130100	189000	52050	15540
CFSM	.16	.46	.39	.19	.18	1.86	1.18	.92	.90	1.26	.35	.11
IN.	.19	.51	.45	.22	.19	2.15	1.32	1.06	1.00	1.46	.40	.12

e Estimated

MINNESOTA RIVER BASIN

05320000 BLUE EARTH RIVER NEAR RAPIDAN, MN--Continued

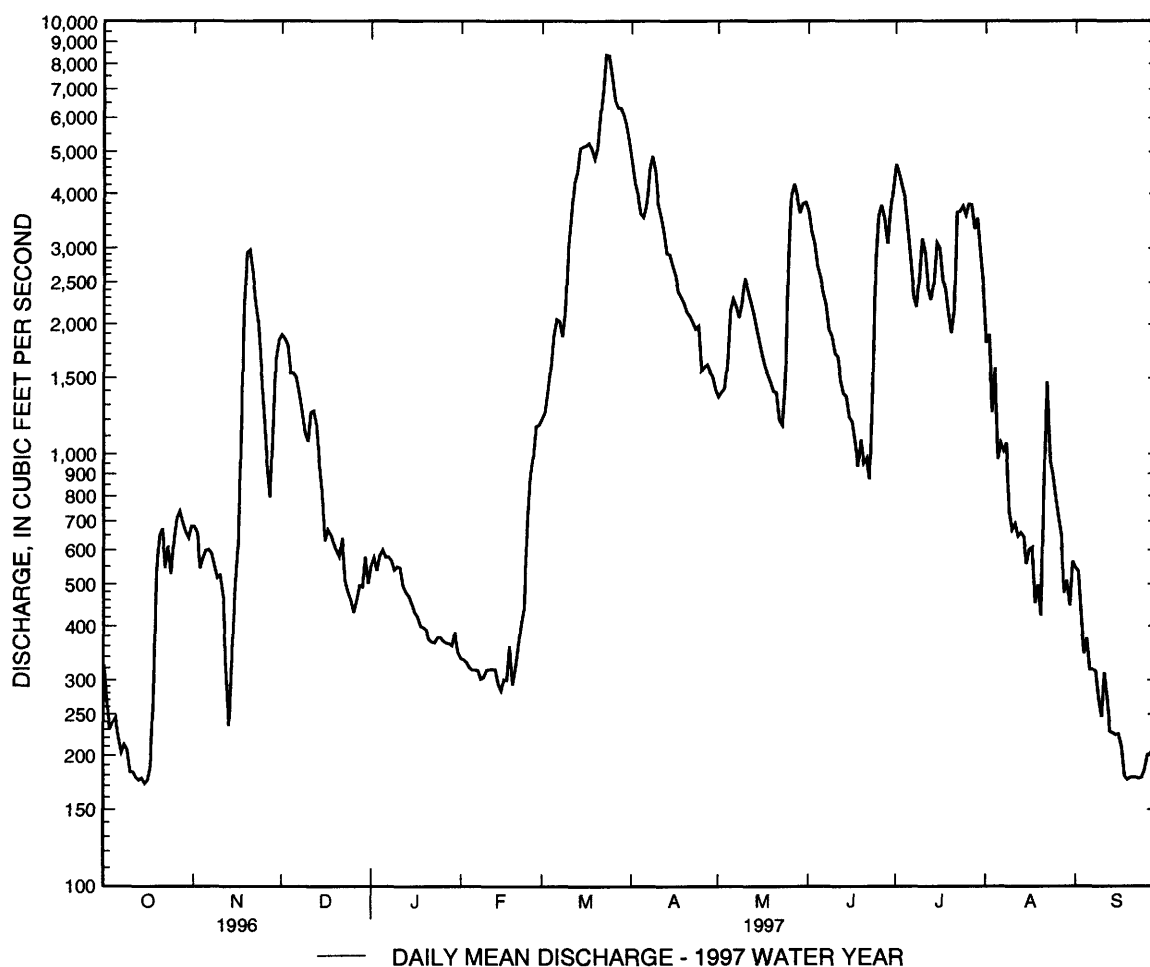
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	561	556	356	208	254	1447	2644	1714	2110	1338	697	535
MAX	5121	2878	1724	1093	1793	6277	13230	5775	11700	8540	5541	4313
(WY)	1969	1993	1992	1992	1983	1983	1965	1991	1993	1993	1979	1993
MIN	22.5	26.7	16.0	14.8	14.3	92.4	142	53.4	110	30.9	37.7	22.1
(WY)	1940	1940	1956	1977	1959	1968	1977	1940	1976	1940	1976	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1909 - 1997	
ANNUAL TOTAL	423918		591383			
ANNUAL MEAN	1158		1620		1053	
HIGHEST ANNUAL MEAN					4518	
LOWEST ANNUAL MEAN					105	
HIGHEST DAILY MEAN	8130	Jun 21	8390	Mar 23	42500	Apr 9 1965
LOWEST DAILY MEAN	96	Feb 2	172	Oct 15	7.4	Oct 28 1955
ANNUAL SEVEN-DAY MINIMUM	109	Jan 30	178	Oct 10	8.1	Oct 24 1955
INSTANTANEOUS PEAK FLOW			9440	Mar 23	43100	Apr 9 1965
INSTANTANEOUS PEAK STAGE			8.62	Mar 23	21.36 _a	Apr 9 1965
INSTANTANEOUS LOW FLOW			155 _b	Oct 15	6.9	Oct 12 1955
ANNUAL RUNOFF (AC-FT)	840800		1173000		762900	
ANNUAL RUNOFF (INCHES)	6.49		9.05		5.89	
10 PERCENT EXCEEDS	2280		3790		2770	
50 PERCENT EXCEEDS	791		1060		357	
90 PERCENT EXCEEDS	213		269		41	

a From floodmark.

b Result of regulation.



MINNESOTA RIVER BASIN

05320270 LITTLE COBB RIVER NEAR BEAUFORD, MN

LOCATION.--Lat 43°59'48", long 93°54'30", in SE 1/4 SE 1/4 sec. 11, T.106 N., R.26 W., Blue Earth County, Hydrologic Unit 07020011, on left bank at downstream end of bridge on County Road No. 16, 1.6 mi upstream from mouth, 2.6 mi east of Beauford, and 5.3 mi northeast of Mapleton.

DRAINAGE AREA.--304 mi².

PERIOD OF RECORD.--April 1996 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 980 ft above sea level from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are fair.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.3	e21	158	e19	e14	e44	302	55	219	198	91	35
2	1.6	e21	145	e19	e13	e50	266	54	196	181	83	29
3	1.3	e21	e138	e20	e13	e58	235	56	172	162	71	23
4	2.0	22	e130	e20	e13	e63	209	59	151	140	60	e21
5	2.8	22	e123	e21	e13	e64	195	60	134	122	50	e20
6	2.2	24	e115	e21	e12	e65	209	61	121	108	47	e19
7	1.9	29	e105	e21	e12	e66	202	61	111	100	42	e18
8	1.9	29	e93	e21	e12	e70	189	67	102	96	38	e18
9	2.4	28	e86	e21	e12	e87	175	83	95	91	32	e18
10	2.7	26	e76	e20	e12	e105	171	87	88	84	28	e17
11	2.5	e24	e65	e20	e11	e130	160	88	82	79	25	e17
12	2.3	e24	e54	e20	e11	e159	145	87	76	71	24	e17
13	2.3	e24	e45	e20	e11	e195	133	84	69	71	24	e17
14	2.3	e24	e34	e19	e11	e210	124	83	62	102	23	e17
15	2.3	23	28	e19	e11	e215	115	79	57	134	28	e17
16	2.3	37	e21	e18	e11	e216	109	73	53	162	41	e17
17	3.9	101	e21	e18	e12	e227	104	67	48	188	41	e18
18	3.9	134	e19	e18	e15	e260	100	62	45	187	37	e17
19	3.9	160	e18	e18	e18	e344	97	58	43	173	35	e16
20	3.7	195	e17	e18	e20	e405	95	53	41	159	34	e15
21	3.2	277	e17	e18	e24	e500	91	48	47	144	32	e15
22	3.4	255	e17	e17	e29	e610	88	45	45	140	30	e14
23	5.8	161	e17	e17	e30	e690	84	42	62	137	26	e14
24	12	165	e16	e17	e32	688	80	105	71	119	23	e13
25	19	162	e16	e16	e32	595	75	188	77	123	e19	e13
26	20	e153	e16	e16	e35	499	70	203	84	128	e18	e13
27	16	e142	e16	e15	e37	453	66	242	85	130	e17	e13
28	14	129	e16	e14	e40	430	64	282	85	132	e17	e12
29	13	116	e17	e14	---	405	62	290	166	122	e17	e12
30	15	141	e18	e14	---	380	58	268	221	111	22	e12
31	21	---	e18	e14	---	340	---	240	---	100	36	---
TOTAL	192.9	2690	1675	563	516	8623	4073	3330	2908	3994	1111	517
MEAN	6.22	89.7	54.0	18.2	18.4	278	136	107	96.9	129	35.8	17.2
MAX	21	277	158	21	40	690	302	290	221	198	91	35
MIN	1.3	21	16	14	11	44	58	42	41	71	17	12
AC-FT	383	5340	3320	1120	1020	17100	8080	6610	5770	7920	2200	1030

e Estimated

MINNESOTA RIVER BASIN

05320270 LITTLE COBB RIVER NEAR BEAUFORD, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 1997, BY WATER YEAR (WY)

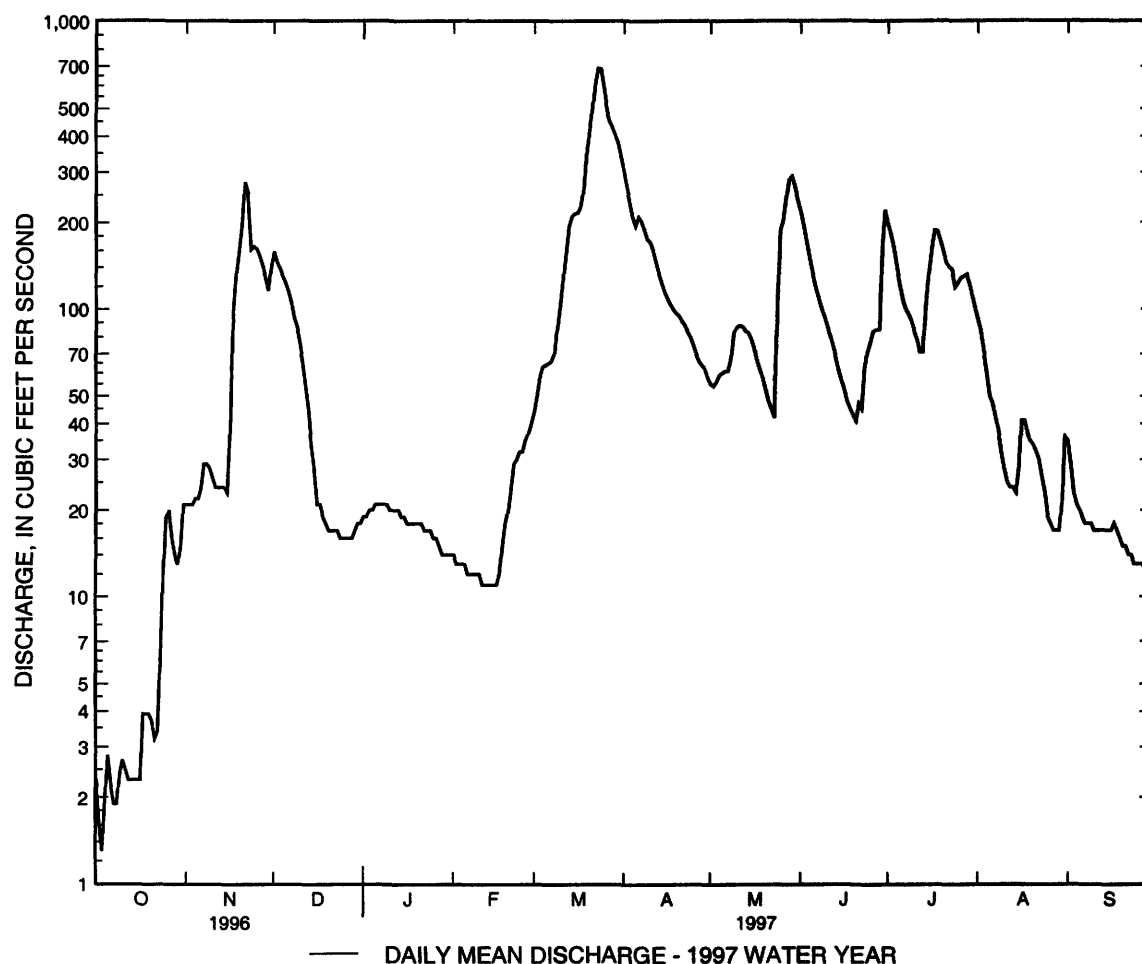
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	6.22	89.7	54.0	18.2	18.4	278	127	92.3	129	78.6	34.3	13.7
MAX	6.22	89.7	54.0	18.2	18.4	278	136	107	161	129	35.8	17.2
(WY)	1997	1997	1997	1997	1997	1997	1997	1997	1996	1997	1997	1997
MIN	6.22	89.7	54.0	18.2	18.4	278	119	77.3	96.9	28.4	32.8	10.2
(WY)	1997	1997	1997	1997	1997	1997	1996	1996	1997	1996	1996	1996

SUMMARY STATISTICS

FOR 1997 WATER YEAR

WATER YEARS 1996 - 1997

ANNUAL TOTAL	30192.9			
ANNUAL MEAN	82.7		82.7	
HIGHEST ANNUAL MEAN			82.7	1997
LOWEST ANNUAL MEAN			82.7	1997
HIGHEST DAILY MEAN	690	Mar 23	690	Mar 23 1997
LOWEST DAILY MEAN	1.3	Oct 3	1.3	Oct 3 1996
ANNUAL SEVEN-DAY MINIMUM	2.0	Oct 2	2.0	Oct 2 1996
INSTANTANEOUS PEAK FLOW	735	Mar 23	735	Mar 23 1997
INSTANTANEOUS PEAK STAGE	11.38	Mar 14	11.38	Mar 14 1997
INSTANTANEOUS LOW FLOW	.71	Oct 2	.71	Oct 2 1996
ANNUAL RUNOFF (AC-FT)	59890		59930	
10 PERCENT EXCEEDS	195		188	
50 PERCENT EXCEEDS	44		51	
90 PERCENT EXCEEDS	12		8.5	



MINNESOTA RIVER BASIN

05320270 LITTLE COBB RIVER NEAR BEAUFORD, MN--Continued
(National Water-Quality Assessment Station)

WATER QUALITY RECORDS

PERIOD OF RECORD.--Water years 1996 to current year.

PERIOD OF DAILY RECORD:

WATER TEMPERATURES.-- April 1996 to current year.

SPECIFIC CONDUCTANCE.-- April 1996 to current year.

INSTRUMENTATION.--Water-quality monitor since April 1996, provides continuous recordings. Sensor located at gage.

REMARKS.--Records represent water temperature at sensor within 0.5°C. Temperature and conductance at the sensor was compared with the average for the river by cross section at least monthly. Variation of temperature was within 0.5°C; variation of conductance was within 37% (correction applied).

EXTREMES FOR PERIOD OF DAILY RECORD:

WATER TEMPERATURES.-- Maximum, 29.5°C, July 18, 1996; minimum, 0.0 °C, on many days during winter.

SPECIFIC CONDUCTANCE.-- Maximum, 1270 µs/cm, July 14, 1997; minimum, 249 µs/cm, Aug. 10, 1996.

EXTREMES FOR CURRENT YEAR:

WATER TEMPERATURES.-- Maximum, 28.5°C, Aug. 3; minimum, 0.0 °C, on many days during winter.

SPECIFIC CONDUCTANCE.-- Maximum, 1270 µs/cm, July 14; minimum, 362 µs/cm, Mar. 13, 14.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	19.0	14.5	16.5	1.5	.0	.5	.0	.0	.0	.0	.0	.0
2	17.0	9.5	14.5	.5	.0	.0	.0	.0	.0	.0	.0	.0
3	12.5	9.5	11.0	3.0	.0	1.0	.0	.0	.0	.0	.0	.0
4	10.5	9.0	10.0	3.5	1.5	2.5	.0	.0	.0	.0	.0	.0
5	16.0	10.5	12.5	5.5	3.5	4.5	.0	.0	.0	.0	.0	.0
6	15.0	13.0	14.0	6.0	4.5	5.5	.0	.0	.0	.0	.0	.0
7	14.0	11.5	12.5	6.0	3.5	4.5	.0	.0	.0	.0	.0	.0
8	11.5	9.5	10.5	4.5	3.0	4.0	.0	.0	.0	.0	.0	.0
9	11.0	10.5	10.5	3.0	1.5	2.5	.0	.0	.0	.0	.0	.0
10	10.5	8.5	9.5	1.5	.0	.5	.0	.0	.0	.0	.0	.0
11	11.5	7.5	9.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
12	12.5	10.0	11.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13	13.5	11.0	12.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14	15.0	12.0	13.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
15	16.0	14.0	14.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
16	17.5	12.5	14.0	2.5	.0	.5	.0	.0	.0	.0	.0	.0
17	15.0	10.5	13.0	2.5	2.0	2.0	.0	.0	.0	.0	.0	.0
18	10.5	8.0	9.0	2.0	1.0	1.5	.0	.0	.0	.0	.0	.0
19	9.0	6.5	8.0	1.0	.5	.5	.0	.0	.0	.0	.0	.0
20	10.5	8.0	9.5	.5	.0	.0	.0	.0	.0	.0	.0	.0
21	11.0	9.5	10.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
22	9.5	7.0	8.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
23	7.0	6.0	6.5	1.0	.0	.5	.0	.0	.0	.0	.0	.0
24	7.0	5.5	6.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
25	9.5	6.5	7.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
26	13.0	9.0	10.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
27	12.0	9.5	10.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
28	9.5	6.0	8.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
29	10.0	7.5	8.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
30	9.5	3.5	6.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
31	3.5	1.0	2.0	---	---	---	.0	.0	.0	.0	.0	.0
MONTH	19.0	1.0	10.3	6.0	.0	1.0	.0	.0	.0	.0	.0	.0

MINNESOTA RIVER BASIN
05320270 LITTLE COBB RIVER NEAR BEAUFORD, MN--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	.0	.0	.0	.0	.0	.0	8.0	6.5	7.5	13.5	7.5	10.5
2	.0	.0	.0	.0	.0	.0	8.5	7.5	8.0	12.5	11.0	11.5
3	.0	.0	.0	.0	.0	.0	9.5	7.5	8.5	14.0	9.5	11.5
4	.0	.0	.0	.0	.0	.0	10.0	9.0	9.5	15.5	10.0	13.0
5	.0	.0	.0	.0	.0	.0	10.5	9.5	10.0	17.0	13.5	15.0
6	.0	.0	.0	.0	.0	.0	10.0	4.0	7.5	17.5	12.0	15.0
7	.0	.0	.0	.0	.0	.0	4.0	2.0	3.0	16.0	13.5	14.0
8	.0	.0	.0	.0	.0	.0	2.0	.5	1.0	13.5	11.0	12.5
9	.0	.0	.0	.0	.0	.0	3.5	.0	1.5	14.5	9.5	11.5
10	.0	.0	.0	.0	.0	.0	3.5	2.5	3.0	16.0	11.0	13.5
11	.0	.0	.0	.0	.0	.0	4.0	2.0	3.0	15.0	12.0	14.0
12	.0	.0	.0	.0	.0	.0	5.5	3.0	4.0	12.5	9.5	11.0
13	.0	.0	.0	.0	.0	.0	8.0	3.5	5.5	10.5	8.5	9.5
14	.0	.0	.0	.0	.0	.0	9.5	5.0	7.0	11.0	8.5	9.5
15	.0	.0	.0	.0	.0	.0	9.5	7.0	8.0	11.5	7.5	9.5
16	.0	.0	.0	.0	.0	.0	7.5	5.0	6.5	13.5	9.0	11.0
17	.0	.0	.0	.0	.0	.0	9.0	4.0	6.5	17.0	11.0	14.0
18	.0	.0	.0	.0	.0	.0	9.0	7.0	8.0	19.5	15.5	17.5
19	.0	.0	.0	.0	.0	.0	12.0	7.0	9.5	18.0	14.0	15.5
20	.0	.0	.0	.0	.0	.0	14.5	10.0	12.5	16.5	12.0	14.5
21	.0	.0	.0	.0	.0	.0	14.5	12.5	13.5	18.0	12.0	15.0
22	.0	.0	.0	1.5	.0	.5	14.5	11.0	13.0	18.0	14.0	16.0
23	.0	.0	.0	2.0	.0	1.0	13.5	11.5	12.5	18.0	15.0	16.5
24	.0	.0	.0	.5	.0	.0	12.5	10.0	11.5	17.0	12.0	14.0
25	.0	.0	.0	2.0	.0	1.0	13.0	9.5	11.5	13.0	11.0	12.0
26	.0	.0	.0	5.0	.5	2.5	13.0	10.5	12.0	13.5	12.5	13.0
27	.0	.0	.0	7.5	4.0	6.0	13.5	11.0	12.5	13.5	12.5	13.0
28	.0	.0	.0	7.5	5.5	6.5	16.0	10.5	13.0	13.5	12.0	12.5
29	---	---	---	7.0	4.5	6.0	17.0	13.0	15.0	12.0	11.5	12.0
30	---	---	---	7.0	6.0	6.5	15.0	10.0	12.5	14.5	11.5	13.0
31	---	---	---	7.0	5.0	6.0	---	---	---	17.5	14.5	16.0
MONTH	.0	.0	.0	7.5	.0	1.2	17.0	.0	8.6	19.5	7.5	13.1

MINNESOTA RIVER BASIN
05320270 LITTLE COBB RIVER NEAR BEAUFORD, MN--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	20.0	17.0	18.5	24.0	20.0	22.0	24.5	21.5	22.5	26.0	22.5	24.0
2	20.5	18.5	19.5	23.5	20.0	21.5	27.0	22.5	24.5	24.5	22.0	23.5
3	20.5	19.0	19.5	20.0	17.5	18.5	28.5	24.5	26.0	22.0	18.5	20.5
4	21.0	19.0	20.0	18.5	16.5	17.0	27.5	24.5	26.0	20.0	17.5	18.5
5	22.5	20.0	21.0	19.5	16.5	18.0	25.5	22.0	24.0	20.0	17.0	18.0
6	22.5	19.5	21.0	21.0	17.5	19.0	25.0	21.5	23.5	23.0	18.5	20.5
7	22.0	19.5	20.5	20.0	18.0	19.0	25.5	21.5	23.5	21.5	20.0	20.5
8	22.0	18.5	20.0	20.5	18.0	19.0	25.5	22.0	23.5	22.5	20.0	21.0
9	22.5	18.5	20.5	21.0	18.5	19.5	24.5	21.0	23.0	21.5	19.0	20.0
10	23.0	19.0	21.0	22.0	18.5	20.0	23.0	20.5	21.0	20.5	16.5	18.5
11	22.5	19.5	21.0	24.5	20.0	22.0	22.5	19.0	20.5	20.5	15.5	18.0
12	23.5	19.5	21.5	26.0	22.5	24.0	21.5	19.5	20.5	20.5	16.0	18.5
13	24.0	20.0	22.0	27.5	24.0	25.5	22.5	18.5	20.5	20.0	18.0	19.0
14	24.0	20.0	22.0	25.5	23.0	24.0	20.5	18.5	19.5	21.0	18.5	19.5
15	23.5	20.5	22.0	25.0	22.0	23.5	25.0	20.0	22.0	22.0	19.5	20.5
16	23.0	20.0	21.5	26.5	23.5	25.0	25.0	21.5	23.5	22.0	20.0	21.0
17	21.5	18.5	20.0	27.0	24.5	25.5	24.5	20.0	21.5	20.0	17.0	18.5
18	21.0	19.0	20.0	26.0	25.0	25.5	21.0	19.0	20.0	21.5	18.0	19.5
19	22.5	18.5	20.5	25.5	24.5	24.5	20.0	18.5	19.0	21.5	17.5	20.0
20	24.0	21.0	22.5	26.0	24.0	25.0	21.5	18.5	19.5	17.5	14.5	15.5
21	25.5	22.0	23.5	27.0	25.0	25.5	22.0	17.5	20.0	15.0	12.0	13.5
22	26.5	22.0	24.0	25.5	23.0	24.5	22.0	18.0	20.0	14.5	14.0	14.0
23	27.0	22.5	24.5	24.5	22.0	23.0	23.5	19.0	21.0	15.5	13.5	14.5
24	26.0	24.0	24.5	25.5	23.0	24.0	23.0	20.5	22.0	16.5	12.5	14.5
25	25.0	22.0	23.5	26.0	23.5	25.0	23.0	20.0	21.5	18.0	14.5	16.0
26	25.5	21.0	23.5	26.5	24.5	25.5	24.5	21.5	22.5	18.0	14.5	16.5
27	26.5	22.0	24.0	26.0	25.0	25.5	23.0	21.5	22.5	18.5	17.0	18.0
28	26.5	22.5	24.5	26.0	24.0	25.0	25.0	20.5	22.5	18.5	15.5	16.5
29	22.5	18.0	19.5	25.0	23.0	24.0	24.5	22.0	23.0	16.5	14.5	15.5
30	20.5	17.0	18.5	24.5	21.5	23.0	26.5	22.0	24.0	16.0	14.0	15.0
31	---	---	---	23.5	21.0	22.5	26.0	22.0	24.0	---	---	---
MONTH	27.0	17.0	21.5	27.5	16.5	22.8	28.5	17.5	22.2	26.0	12.0	18.3

MINNESOTA RIVER BASIN

05320270 LITTLE COBB RIVER NEAR BEAUFORD, MN--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	623	594	610	727	691	708	731	727	729	804	795	799
2	618	588	606	740	701	713	749	731	740	797	787	791
3	625	598	611	746	715	731	772	748	760	788	780	783
4	620	586	607	742	714	731	774	768	772	781	763	773
5	602	575	587	740	725	732	776	762	769	763	756	759
6	607	582	595	732	721	724	763	755	759	769	760	763
7	610	584	601	723	703	712	763	756	758	781	754	767
8	604	586	593	713	704	708	775	762	769	781	775	778
9	603	587	594	727	713	717	775	767	771	780	775	778
10	604	594	601	740	727	734	775	770	773	793	779	784
11	610	595	603	779	740	754	775	763	772	802	793	797
12	612	596	606	797	774	785	763	753	757	817	799	805
13	616	607	612	801	785	792	755	743	749	831	817	825
14	617	603	609	812	801	807	751	745	749	843	831	838
15	612	604	608	814	768	794	771	751	764	848	843	846
16	621	610	617	768	681	723	773	762	768	849	846	847
17	618	584	594	687	653	670	784	772	780	851	847	849
18	603	593	597	697	655	673	795	783	789	852	848	850
19	624	603	615	725	697	712	793	786	790	854	850	852
20	636	618	630	730	724	728	823	790	808	856	853	854
21	641	633	636	731	723	726	825	819	822	858	855	857
22	652	641	647	736	731	734	819	809	813	859	857	858
23	647	602	618	736	731	734	812	805	809	857	849	853
24	638	604	624	747	731	737	811	806	808	852	844	848
25	631	604	622	772	747	760	810	797	804	844	836	840
26	607	598	603	791	772	784	815	789	805	837	831	834
27	618	600	609	797	788	794	817	813	815	832	830	831
28	670	611	652	800	790	795	818	809	814	834	831	833
29	690	653	668	796	766	785	809	803	805	843	834	839
30	681	658	672	766	727	741	808	803	805	847	843	845
31	708	678	699	---	---	---	808	801	804	847	846	846
MONTH	708	575	618	814	653	741	825	727	782	859	754	820

MINNESOTA RIVER BASIN

05320270 LITTLE COBB RIVER NEAR BEAUFORD, MN--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	847	846	846	564	544	553	532	524	528	615	599	600
2	847	846	846	544	539	541	532	531	531	613	590	601
3	847	844	846	540	538	539	537	532	533	590	578	585
4	845	838	842	540	539	539	550	537	544	612	586	594
5	838	832	835	539	538	539	554	550	552	607	586	600
6	832	827	830	538	536	537	558	552	555	603	581	595
7	827	824	825	539	537	538	586	558	577	619	597	600
8	825	823	824	543	539	541	606	586	596	609	599	604
9	825	823	824	551	543	547	618	606	613	628	608	618
10	825	824	824	551	533	547	635	618	626	648	627	630
11	828	825	826	533	407	486	640	635	637	653	640	647
12	830	826	828	407	397	402	643	640	641	667	644	651
13	833	829	831	402	362	387	645	643	645	665	638	651
14	835	832	834	376	362	367	646	641	644	651	642	645
15	838	834	836	414	376	395	645	642	643	659	642	652
16	840	837	838	452	414	436	645	643	644	642	589	621
17	841	839	840	476	452	465	645	642	644	589	544	565
18	843	840	842	489	476	485	645	637	641	619	521	557
19	843	835	840	502	488	496	637	626	632	671	616	642
20	835	803	822	491	440	466	628	621	624	688	657	670
21	803	674	733	440	404	421	621	611	614	721	657	690
22	674	638	655	404	390	395	612	604	608	703	638	656
23	638	597	617	404	391	398	609	603	606	644	627	634
24	597	575	587	436	402	418	616	605	611	633	572	602
25	575	565	569	467	436	452	624	613	619	653	633	645
26	565	562	564	494	467	482	632	622	627	653	615	637
27	565	562	564	506	493	500	637	628	633	645	611	627
28	564	562	563	514	500	511	636	596	618	651	644	648
29	---	---	---	513	511	512	608	596	604	651	647	640
30	---	---	---	518	512	515	607	599	602	658	648	655
31	---	---	---	524	518	521	---	---	---	667	656	663
MONTH	847	562	769	564	362	482	646	524	606	721	521	620

MINNESOTA RIVER BASIN

05320270 LITTLE COBB RIVER NEAR BEAUFORD, MN--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	668	651	662	642	619	630	636	597	612	556	491	517
2	659	634	647	658	634	647	600	574	590	584	547	570
3	647	622	634	658	635	647	574	545	561	583	569	576
4	638	606	626	658	642	652	545	530	539	579	567	574
5	606	592	598	662	653	658	540	525	532	579	565	573
6	611	590	600	668	657	662	532	504	512	576	551	563
7	615	609	612	674	625	658	564	510	530	574	547	558
8	631	613	620	651	627	644	592	564	579	576	550	564
9	644	614	627	645	628	639	588	566	574	593	569	576
10	622	606	614	648	626	634	572	561	566	594	564	574
11	606	585	598	649	624	636	652	561	575	570	560	566
12	605	587	601	650	635	641	567	542	550	577	567	573
13	607	587	600	905	646	751	549	529	541	590	574	583
14	606	584	595	1270	902	1040	544	528	534	600	589	595
15	612	593	604	1240	611	690	530	495	515	601	588	596
16	613	599	606	652	615	639	533	507	521	598	586	594
17	617	610	613	653	643	649	525	482	506	587	573	582
18	646	609	628	651	643	649	563	525	534	580	572	576
19	632	594	606	652	642	647	595	562	583	590	577	582
20	617	574	592	643	617	632	570	554	561	578	572	575
21	625	536	565	628	614	620	555	537	549	580	566	574
22	578	556	567	630	592	612	578	550	560	578	549	568
23	581	542	565	630	613	623	576	537	555	568	548	559
24	668	578	593	644	622	632	577	533	559	566	556	561
25	641	586	623	642	605	626	574	531	552	572	557	566
26	632	605	618	657	625	636	549	520	536	594	561	579
27	630	593	612	648	628	638	532	517	524	587	562	578
28	617	483	579	658	632	649	533	508	522	582	566	576
29	584	552	565	648	633	642	527	514	521	623	566	599
30	632	562	603	661	638	651	522	488	501	630	610	621
31	---	---	---	661	634	646	502	440	480	---	---	---
MONTH	668	483	606	1270	592	659	652	440	544	630	491	575

MINNESOTA RIVER BASIN

05320270 LITTLE COBB RIVER NEAR BEAUFORD, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (0030C)
OCT									
02...	1040	1.6	611	612	8.1	8.0	14.5	748	6.3
NOV									
04...	1110	22	729	751	8.0	8.0	3.0	736	11.9
DEC									
10...	1155	77	766	753	7.9	8.0	0.0	730	11.5
JAN									
13...	1230	20	816	833	7.1	7.5	0.0	754	6.7
FEB									
12...	1300	11	821	835	7.4	7.7	0.0	750	8.8
MAR									
05...	1250	63	457	457	7.1	7.5	0.0	745	4.6
18...	1145	679	438	463	6.9	7.4	0.0	750	5.6
APR									
08...	1150	189	600	627	7.9	7.9	1.0	751	12.7
16...	1145	92	630	656	8.4	8.1	6.0	746	12.5
24...	1250	81	616	623	8.3	8.2	11.5	738	8.3
28...	1250	65	609	614	8.4	8.3	13.0	733	11.5
MAY									
08...	1137	65	619	630	8.2	8.0	12.5	735	10.4
15...	1115	80	653	662	8.3	8.0	8.5	--	11.5
22...	1255	45	646	637	8.3	8.2	16.0	743	10.8
28...	1128	278	662	645	8.0	8.0	12.5	743	8.9
JUN									
05...	1230	134	604	598	8.1	8.2	21.5	735	8.5
09...	1300	98	623	622	8.1	7.9	20.0	746	8.1
18...	1130	45	627	606	8.2	8.0	19.0	735	7.6
23...	1158	63	564	550	7.9	8.0	23.0	743	6.7
JUL									
03...	1115	164	666	647	7.9	8.0	18.0	736	7.6
11...	1340	77	612	598	8.0	8.0	22.0	739	7.3
16...	1128	162	622	597	8.0	8.0	24.0	736	6.6
24...	1300	118	658	639	7.9	7.9	24.0	738	6.1
31...	1145	101	651	642	8.1	8.1	21.5	747	7.5
AUG									
08...	1210	35	582	577	8.3	8.2	22.5	738	7.3
15...	1140	29	516	507	8.1	8.2	20.0	--	7.9
18...	1500	35	539	--	8.3	--	21.0	--	8.9
20...	1431	34	554	553	8.3	7.7	20.0	740	8.7
26...	1222	17	535	525	8.3	8.3	21.5	740	7.9
SEP									
09...	1225	18	565	540	8.2	8.2	19.5	739	9.5

MINNESOTA RIVER BASIN

05320270 LITTLE COBB RIVER NEAR BEAUFORD, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)
OCT										
02...	62	290	275	275	336	--	<0.015	<0.010	0.70	1.9
NOV										
04...	92	350	318	323	388	--	0.080	0.040	0.70	1.0
DEC										
10...	83	420	320	338	390	--	0.080	0.040	0.70	0.70
JAN										
13...	48	420	353	367	430	--	0.230	0.070	0.90	1.1
FEB										
12...	61	430	359	372	438	--	0.430	0.040	1.0	1.1
MAR										
05...	32	200	190	193	232	--	0.470	0.080	1.2	1.5
18...	39	220	172	184	210	--	0.440	0.120	1.2	1.3
APR										
08...	90	290	245	252	299	--	0.050	0.040	0.70	1.4
16...	102	320	256	274	298	7	<0.015	0.020	0.50	1.0
24...	79	300	246	257	300	--	<0.015	0.032	0.45	0.80
28...	113	300	238	254	276	7	<0.015	0.035	0.45	0.79
MAY										
08...	101	300	252	263	307	--	<0.015	0.060	0.52	1.0
15...	100	330	261	281	318	--	<0.015	0.045	0.43	0.86
22...	112	340	251	278	292	6	<0.015	0.055	0.49	1.2
28...	86	330	258	264	315	--	<0.015	0.077	0.88	1.2
JUN										
05...	99	290	228	240	278	--	<0.015	0.068	0.53	1.8
09...	92	300	244	257	298	--	<0.015	0.067	0.44	1.1
18...	85	330	263	259	321	--	<0.015	0.075	0.54	1.4
23...	80	270	205	225	250	--	0.036	0.084	0.47	1.7
JUL										
03...	84	330	258	272	315	--	<0.015	0.070	0.86	1.8
11...	86	290	256	286	312	--	<0.015	0.043	0.58	1.3
16...	81	320	233	255	281	--	<0.015	0.071	0.62	0.99
24...	75	330	239	281	292	--	<0.015	0.105	0.76	1.0
31...	86	330	247	288	301	--	<0.015	0.044	0.67	1.8
AUG										
08...	87	290	226	258	276	--	0.022	0.026	0.57	1.2
15...	91	250	204	225	249	--	<0.015	0.023	0.66	1.2
18...	102	--	222	--	266	2	0.015	0.030	0.74	1.2
20...	100	270	218	258	266	--	<0.015	0.031	0.76	1.7
26...	92	260	207	234	253	--	<0.015	0.022	0.71	1.4
SEP										
09...	107	280	250	255	305	--	<0.015	0.023	0.70	1.3

MINNESOTA RIVER BASIN

05320270 LITTLE COBB RIVER NEAR BEAUFORD, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)
OCT										
02...	0.080	0.180	0.030	0.040	9.2	4.3	69	29	16	3.2
NOV										
04...	6.50	0.160	0.100	0.110	6.9	1.5	91	31	14	2.5
DEC										
10...	10.0	0.060	0.050	0.050	5.3	0.60	110	35	12	1.9
JAN										
13...	9.50	0.110	0.070	0.080	5.9	0.20	110	35	14	2.4
FEB										
12...	6.80	0.110	0.100	0.100	6.6	0.30	110	37	16	2.3
MAR										
05...	6.30	0.350	0.250	0.310	7.6	0.90	54	17	5.9	3.6
18...	6.10	0.270	0.220	0.230	8.1	0.80	59	17	5.3	3.6
APR										
08...	8.10	0.190	0.070	0.080	6.1	1.8	77	24	8.1	2.0
16...	8.50	0.120	0.010	0.010	5.2	2.7	82	28	9.8	1.7
24...	6.64	0.068	<0.010	<0.010	5.4	--	76	26	9.4	1.6
28...	6.46	0.060	<0.010	<0.010	5.4	0.20	72	30	11	1.6
MAY										
08...	6.42	0.080	0.030	0.016	5.5	0.80	73	28	11	2.0
15...	8.38	0.069	0.017	0.018	4.4	1.0	82	30	11	1.5
22...	6.44	0.103	0.019	0.020	5.0	2.0	85	31	12	1.7
28...	13.1	0.188	0.087	0.096	6.5	2.5	85	28	9.5	2.2
JUN										
05...	9.92	0.160	<0.010	<0.010	5.2	>5.0	68	29	9.8	1.4
09...	10.0	0.015	<0.010	<0.010	5.0	4.9	73	30	10	1.4
18...	8.75	0.185	0.023	0.026	7.7	3.5	77	32	12	1.8
23...	7.06	0.277	0.057	0.045	5.4	>5.0	63	27	9.8	1.7
JUL										
03...	10.5	0.228	0.050	0.057	6.7	3.8	85	29	9.1	1.7
11...	7.37	0.248	<0.010	0.020	6.0	>5.0	73	27	9.2	1.4
16...	9.71	0.166	0.103	0.104	6.4	4.0	81	27	9.2	2.2
24...	7.61	0.133	0.083	0.079	6.6	>5.0	84	29	9.2	2.0
31...	7.17	0.261	0.040	0.051	7.2	3.9	83	30	10	1.7
AUG										
08...	4.22	0.171	0.041	0.052	7.0	4.4	69	28	10	1.8
15...	2.39	0.187	0.061	0.060	7.2	4.0	59	25	10	1.9
18...	2.92	0.170	0.053	0.049	8.0	3.1	--	--	--	--
20...	2.81	0.213	0.070	0.067	7.4	3.7	63	27	10	2.1
26...	1.61	0.163	0.051	0.025	7.6	3.4	62	27	11	2.0
SEP										
09...	1.87	0.180	0.119	0.084	7.8	2.7	66	29	11	2.4

MINNESOTA RIVER BASIN

05320270 LITTLE COBB RIVER NEAR BEAUFORD, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
02...	22	34	0.40	20	12	81	375	359	22	96
NOV										
04...	21	43	0.50	25	4.0	25	465	448	138	30
DEC										
10...	18	36	0.50	26	<3.0	44	487	476	142	28
JAN										
13...	21	35	0.40	26	8.0	110	514	498	144	46
FEB										
12...	23	41	0.50	27	10	83	525	503	120	45
MAR										
05...	11	17	0.30	18	11	59	290	270	19	98
18...	11	20	0.30	18	12	17	295	266	13	90
APR										
08...	13	36	0.38	19	<3.0	16	370	363	146	93
16...	14	37	0.48	15	<3.0	13	426	379	104	50
24...	16	36	0.45	9.4	9.2	24	385	352	97	54
28...	16	37	0.43	8.0	4.3	14	368	348	70	74
MAY										
08...	16	32	0.47	9.4	<3.0	31	385	352	77	62
15...	16	31	0.51	13	4.5	15	410	378	91	66
22...	17	30	0.50	12	<3.0	28	394	367	103	79
28...	15	24	0.45	24	4.0	13	441	401	107	85
JUN										
05...	15	24	0.48	14	3.5	1.7	378	343	177	95
09...	16	25	0.49	13	<3.0	4.3	384	360	215	99
18...	16	24	0.54	19	<3.0	3.4	384	380	252	88
23...	17	21	0.44	21	<3.0	5.0	348	314	224	99
JUL										
03...	14	24	0.55	28	<3.0	3.1	439	393	193	86
11...	14	22	0.48	22	<3.0	<1.0	420	356	60	91
16...	13	18	0.47	29	<3.0	1.8	414	362	273	95
24...	14	19	0.48	29	<3.0	<1.0	433	365	319	91
31...	15	18	0.55	29	<3.0	1.6	487	367	274	90
AUG										
08...	15	20	0.45	25	<3.0	2.8	383	325	109	99
15...	16	18	0.41	21	<3.0	9.1	326	286	83	98
18...	--	--	--	--	--	--	--	--	103	99
20...	17	21	0.40	22	3.3	12	326	306	78	100
26...	17	22	0.43	22	<3.0	2.9	343	294	--	--
SEP										
09...	17	21	0.39	21	<3.0	36	361	326	--	--

MINNESOTA RIVER BASIN

05320500 LE SUEUR RIVER NEAR RAPIDAN, MN

LOCATION.--Lat 44°06'40", long 94°02'28", in SW¹/₄ sec. 35, T.108 N., R.27 W., Blue Earth County, Hydrologic Unit 07020011, on right bank 600 ft downstream from highway bridge, 1.8 mi northeast of Rapidan, and 2.3 mi upstream from mouth.

DRAINAGE AREA.--1,100 mi², approximately.

PERIOD OF RECORD.--October 1939 to September 1945, July 1949 to current year.

GAGE.--Water-stage recorder. Datum of gage is 775.76 ft above mean sea level. Prior to Nov. 15, 1939, nonrecording gage at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair to poor.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov. 19	1200	1320	3.86	May 26	2400	2620	5.29
Mar. 14	(daily)	2000	--	June 29	2100	2690	5.86
Mar. 23	(daily)	a*5400	*8.00	July 22	1700	2380	5.01
Apr. 09	1300	2550	5.20				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	65	191	e405	e275	e180	e220	2320	539	1910	2290	916	528
2	56	180	e410	e270	e180	e240	2110	522	1720	1920	779	433
3	43	188	e405	e270	e175	e270	1920	534	1540	1470	673	379
4	40	225	e400	e265	e170	e300	1750	544	1370	1130	596	341
5	41	236	e385	e260	e170	e320	1670	660	1220	912	515	e300
6	40	227	e375	e260	e170	e330	1860	705	1100	785	487	e265
7	42	219	e360	e255	e165	e320	1920	697	1000	681	442	e240
8	47	223	e340	e255	e165	e290	2230	707	928	692	406	e215
9	45	238	e330	e250	e160	e260	2500	729	879	682	361	e200
10	43	240	e320	e250	e160	e230	2340	776	816	667	341	e190
11	40	222	e310	e245	e160	e600	1970	794	791	616	e305	e180
12	38	154	e305	e240	e160	e1700	1600	754	704	575	e305	e165
13	47	192	e295	e235	e160	e2000	1340	712	590	647	e295	e150
14	44	195	e290	e230	e160	e1950	1200	666	534	1400	e280	e150
15	40	244	e290	e230	e160	e1900	1110	607	491	1690	e260	e145
16	38	322	e290	e225	e160	e1750	1050	569	439	1860	372	e155
17	45	709	e290	e225	e160	e1600	973	523	414	1780	609	e165
18	61	1050	e290	e220	e165	e1450	939	493	391	1710	636	170
19	71	1300	e290	e220	e170	e1350	914	470	374	1750	568	178
20	73	1230	e290	e220	e175	e2100	890	444	365	1630	552	185
21	78	1090	e285	e215	e175	e3200	855	422	499	1580	608	176
22	78	e900	e285	e210	e180	e4500	824	397	499	1900	571	175
23	89	e720	e285	e210	e180	e5400	770	385	701	1880	498	181
24	109	e560	e285	e205	e180	5240	717	677	728	1540	437	179
25	138	e400	e285	e200	e185	4270	692	1920	753	1530	401	195
26	243	e320	e280	e200	e190	3570	638	2480	721	1650	359	217
27	251	e340	e280	e195	e195	3560	600	2560	687	1670	335	212
28	214	e360	e280	e190	e205	3580	583	2310	676	1460	e300	209
29	199	e375	e280	e190	---	3280	581	2140	2130	1340	e280	186
30	200	e395	e275	e185	---	2910	553	2150	2590	1320	e360	159
31	188	---	e275	e185	---	2540	---	2060	---	1090	426	---
TOTAL	2746	13245	9765	7085	4815	61230	39419	29946	27560	41847	14273	6623
MEAN	88.6	442	315	229	172	1975	1314	966	919	1350	460	221
MAX	251	1300	410	275	205	5400	2500	2560	2590	2290	916	528
MIN	38	154	275	185	160	220	553	385	365	575	260	145
AC-FT	5450	26270	19370	14050	9550	121400	78190	59400	54670	83000	28310	13140
CFSM	.08	.40	.28	.21	.15	1.78	1.18	.87	.83	1.22	.41	.20

a Maximum daily, backwater from ice.

e Estimated

MINNESOTA RIVER BASIN

05320500 LE SUEUR RIVER NEAR RAPIDAN, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 1997, BY WATER YEAR (WY)

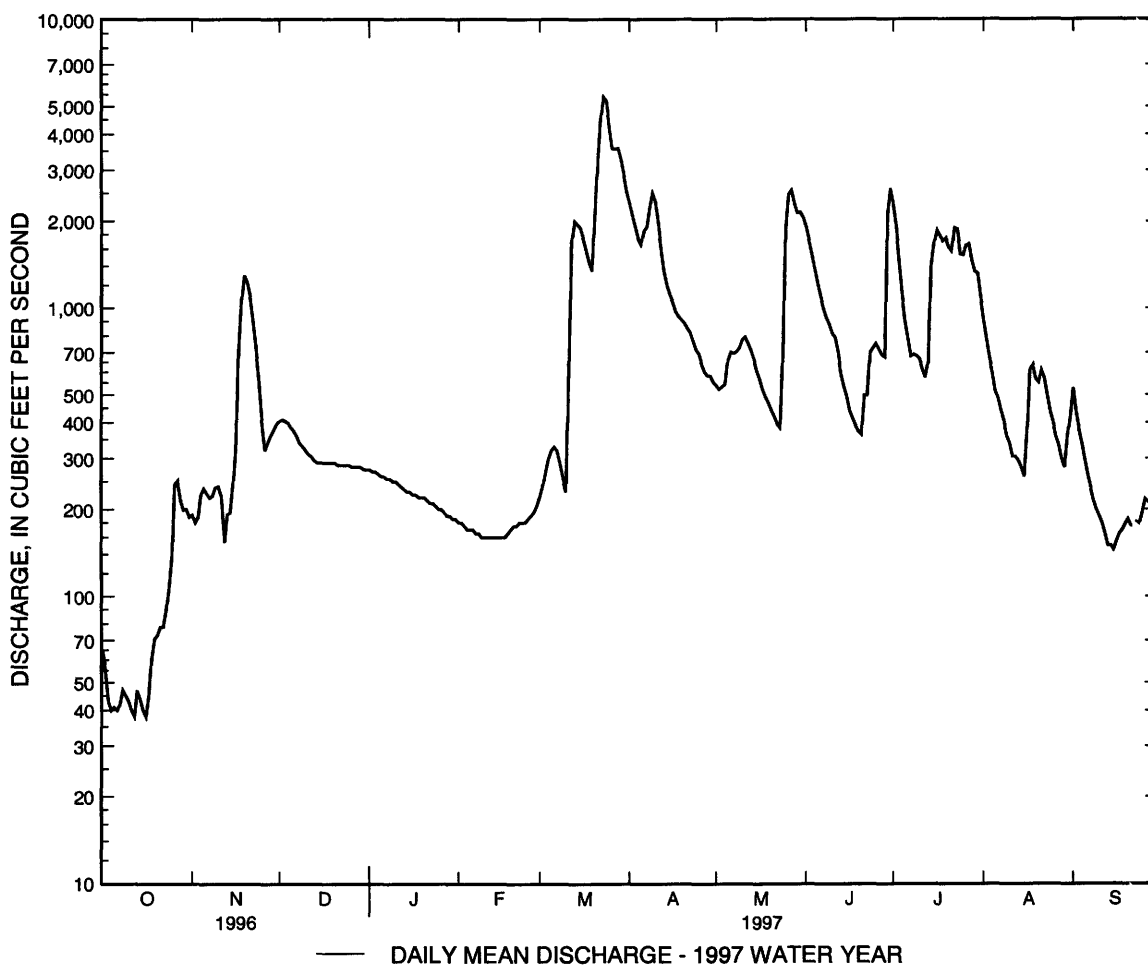
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	329	277	152	85.4	128	824	1328	909	965	628	415	255
MAX	3300	1561	698	493	1299	3465	6563	3706	3913	2760	3656	1526
(WY)	1969	1993	1992	1992	1984	1983	1965	1960	1993	1993	1993	1993
MIN	7.41	11.1	5.04	2.96	1.68	33.0	48.3	18.8	40.4	20.6	8.20	7.55
(WY)	1990	1956	1959	1957	1959	1964	1957	1940	1950	1988	1989	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1940 - 1977	
ANNUAL TOTAL	204591		258554		527	
ANNUAL MEAN	559		708		2035	
HIGHEST ANNUAL MEAN					51.4	
LOWEST ANNUAL MEAN					1977	
HIGHEST DAILY MEAN	6320		Jun 18		5400	
LOWEST DAILY MEAN	38		Oct 12		Mar 23	
ANNUAL SEVEN-DAY MINIMUM	41		Oct 10		23400	
INSTANTANEOUS PEAK FLOW			5400 ^a		Mar 23	
INSTANTANEOUS PEAK STAGE			8.00 ^b		Oct 12	
INSTANTANEOUS LOW FLOW			36		24700	
ANNUAL RUNOFF (AC-FT)	405800		512800		1.6	
ANNUAL RUNOFF (CFSM)	.50		.64		22.72 ^c	
10 PERCENT EXCEEDS	972		1890		1.6	
50 PERCENT EXCEEDS	293		361		152	
90 PERCENT EXCEEDS	78		160		16	

a Maximum daily, backwater from ice.

b Backwater from ice.

c From highwater mark.



MINNESOTA RIVER BASIN

05325000 MINNESOTA RIVER AT MANKATO, MN

LOCATION(REVISED).--Lat 44°10'08", long 94°00'11", in SE¼SW¼ sec. 7, T. 108 N., R. 26 W., Blue Earth County, Hydrologic Unit 070207, on right bank 300 ft downstream from Memorial bridge in Mankato, 2.0 mi downstream from Blue Earth River and at mile 106.2 upstream from Mississippi River.

DRAINAGE AREA.--14,900 mi², approximately.

PERIOD OF RECORD.--May 1903 to current year (no winter records 1904, 1906-10, 1918-29). Monthly discharge only for some periods, published in WSP 1308. Published as "near Mankato": 1903-21.

REVISED RECORDS.--WSP 875: 1917. WSP 955: Drainage area. WSP 1085: 1929. WSP 1238: 1903, 1908, 1919. WSP 1508: 1916(M) 1918(M), 1926(M), 1928, 1930, 1932(M), 1938(M). WDR-MN-76-1: 1881(M).

GAGE.--Water-stage recorder. Datum of gage is 747.92 ft above sea level. Prior to Oct. 19, 1921, nonrecording gage, at site 1.8 mi upstream at datum 6.4 ft higher. Mar. 15, 1922 to Nov. 30, 1924, nonrecording gage, and Dec. 1, 1924 to May 24, 1971, recorder at site 0.2 mi upstream at present datum. May 25, 1971 to Aug. 14, 1977, recorder at site 0.5 mi upstream at present datum. Aug. 14, 1977 to July 27, 1978, nonrecording gage; and from July 28, 1978 to Sept. 30, 1993, recording gage at site 0.7 mi upstream of present site.

REMARKS.--Records fair.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage, 29.9 ft, Apr. 26, 1881, near present site and datum, from floodmark (discharge, 110,000 ft³/s).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1190	2930	e3400	e2300	e1600	e2350	42100	20600	10700	13400	12500	3270
2	1190	3000	e3300	e2300	e1600	e2800	42700	19700	10100	14000	11400	3150
3	1100	3030	e3300	e2300	e1600	e3400	43600	19100	9720	e13500	10000	2790
4	1070	3070	e3300	e2200	e1600	e3900	44600	18500	9160	e12300	9080	2540
5	1060	3190	e3300	e2200	e1550	e4500	47000	18700	8780	e11400	7440	2470
6	1030	3280	e3300	e2100	e1550	e4900	51800	18500	8320	e10800	6740	2420
7	968	3290	e3400	e2000	e1550	e5200	61900	18100	7940	e10600	6340	2370
8	962	3220	e3400	e1900	e1550	e5500	72600	17600	7590	10300	6040	2300
9	970	3170	e3400	e1850	e1550	e5800	78500	17300	7230	10200	5520	2260
10	932	3120	e3300	e1800	e1550	e7400	77900	17000	6900	10500	5080	2220
11	897	2980	e3300	e1750	e1550	8920	74700	16500	6610	10200	4880	2190
12	890	2740	e3100	e1700	e1550	10700	70200	15900	6110	9700	4640	2050
13	905	2450	e3000	e1650	e1550	12100	64800	15300	5720	9500	4520	1920
14	883	2400	e3000	e1650	e1550	13000	59100	14600	5410	10400	4380	1900
15	893	2380	e2900	e1610	e1550	12600	53500	14100	5050	11000	4240	1830
16	910	2850	e2800	e1610	e1550	12200	49000	13400	4830	11300	4160	1750
17	1140	e4000	e2800	e1650	e1550	11900	45500	12800	4440	10700	4190	1660
18	1390	e4200	e2700	e1700	e1550	11600	42700	12200	4100	10400	4050	1570
19	1510	e4400	e2700	e1700	e1550	11100	40600	11800	4100	10000	4020	1560
20	1700	e4400	e2600	e1650	e1550	12400	38400	11300	4040	9400	4040	1520
21	1920	e4200	e2600	e1650	e1550	15500	36300	10700	4180	9200	4410	1470
22	1970	e4000	e2500	e1600	e1600	18700	34300	10000	4170	11300	5490	1460
23	2140	e3800	e2500	e1600	e1650	22200	32400	9570	4380	12100	5240	1490
24	2180	e3700	e2500	e1600	e1750	25400	30500	9610	5730	11400	4690	1520
25	2310	3540	e2500	e1600	e1850	25400	28800	11100	6790	11400	4310	1530
26	2610	e3500	e2400	e1600	e1950	24200	26800	12100	7840	13000	3910	1540
27	2800	e3500	e2300	e1600	e2050	24600	25500	12300	8120	14800	3660	1490
28	2730	e3500	e2300	e1600	e2200	27000	24100	11700	7700	15400	3310	1480
29	2750	e3400	e2300	e1600	---	29400	22800	11200	10200	15500	e3170	1450
30	2880	e3400	e2300	e1600	---	33000	21800	11200	12200	15000	3120	1370
31	2830	---	e2300	e1600	---	38800	---	11100	---	13900	3240	---
TOTAL	48710	100640	88800	55270	45800	446470	1384500	443580	208160	362600	167810	58540
MEAN	1571	3355	2865	1783	1636	14400	46150	14310	6939	11700	5413	1951
MAX	2880	4400	3400	2300	2200	38800	78500	20600	12200	15500	12500	3270
MIN	883	2380	2300	1600	1550	2350	21800	9570	4040	9200	3120	1370
AC-FT	96620	199600	176100	109600	90840	885600	2746000	879800	412900	719200	332900	116100
CFSM	.11	.23	.19	.12	.11	.97	3.10	.96	.47	.79	.36	.13
IN.	.12	.25	.22	.14	.11	1.11	3.46	1.11	.52	.91	.42	.15

e Estimated

MINNESOTA RIVER BASIN

05325000 MINNESOTA RIVER AT MANKATO, MN--Continued

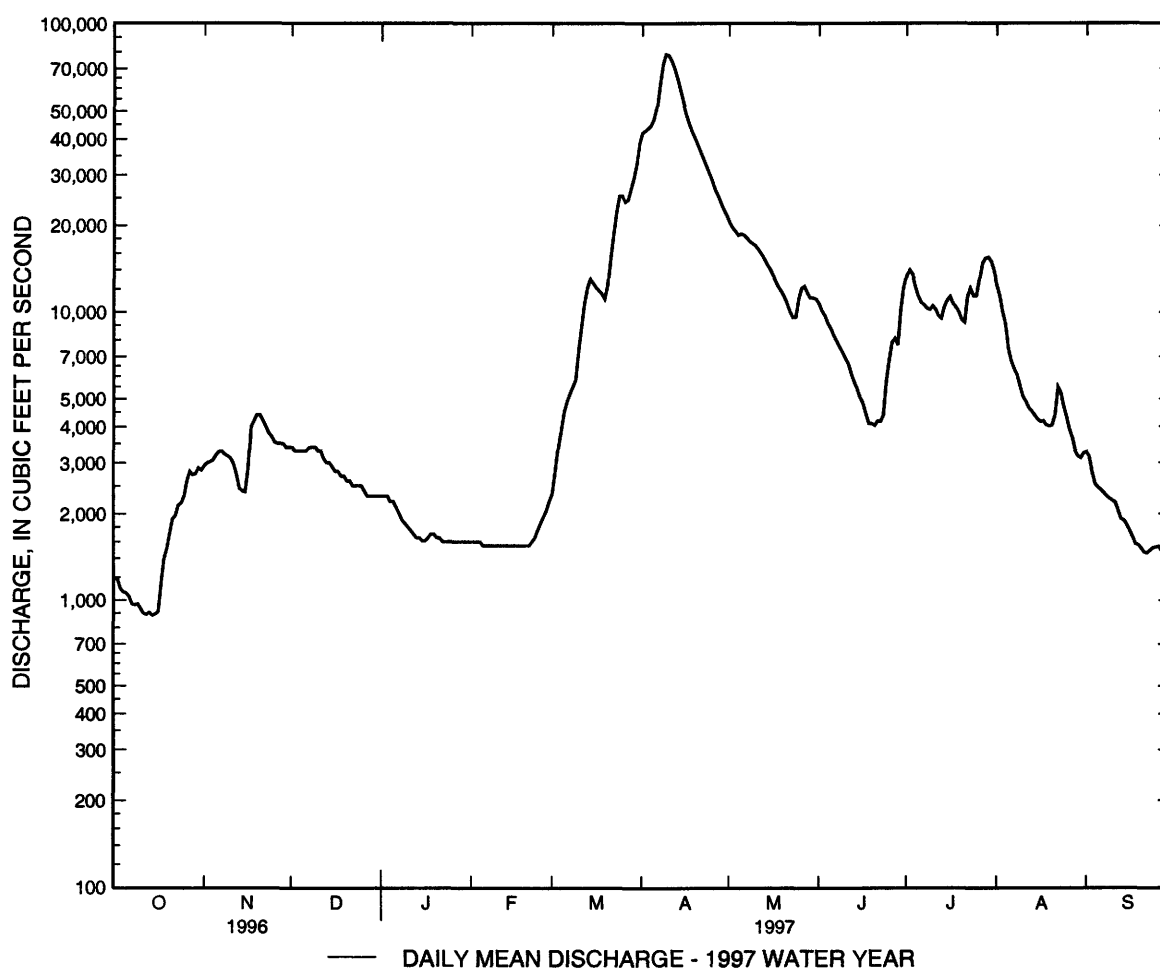
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1903 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	1639	1559	1018	632	752	4559	9317	5750	6086	4529	2374	1665
MAX	14600	8569	4770	3009	4505	18230	46150	22540	34230	33130	23520	11070
(WY)	1969	1996	1983	1992	1983	1983	1997	1993	1993	1993	1993	1993
MIN	66.1	83.5	80.9	61.5	58.4	132	609	101	194	58.3	37.4	56.6
(WY)	1934	1934	1934	1940	1940	1934	1931	1934	1934	1934	1934	1934

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1903 - 1997	
ANNUAL TOTAL	2058886		3410880			
ANNUAL MEAN	5625		9345		3476 ^a	
HIGHEST ANNUAL MEAN					14890	
LOWEST ANNUAL MEAN					136	
HIGHEST DAILY MEAN	27700		78500		92700	
LOWEST DAILY MEAN	883		883		31	
ANNUAL SEVEN-DAY MINIMUM	901		901		33	
INSTANTANEOUS PEAK FLOW			79800		94100	
INSTANTANEOUS PEAK STAGE			27.61		30.11	
INSTANTANEOUS LOW FLOW			869		26 ^b	
ANNUAL RUNOFF (AC-FT)	4084000		6765000		2518000	
ANNUAL RUNOFF (CFSM)	.38		.63		.23	
ANNUAL RUNOFF (INCHES)	5.14		8.52		3.17	
10 PERCENT EXCEEDS	12600		23300		9090	
50 PERCENT EXCEEDS	3000		3800		1240	
90 PERCENT EXCEEDS	1420		1550		186	

a Median of annual mean discharges is 2759 ft³/s.

b Minimum observed.



[illegible]

MINNESOTA RIVER BASIN

05325000 MINNESOTA RIVER AT MANKATO, MN--Continued

SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)	MEAN CONCENTRATION (MG/L)	LOAD (TONS/ DAY)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	126	404	265	2100	233	2140	195	1210	164	707	165	1050
2	147	473	264	2140	232	2060	194	1210	163	703	167	1270
3	82	243	263	2150	230	2050	193	1200	162	699	170	1560
4	111	322	263	2180	229	2040	192	1140	161	695	173	1820
5	121	346	271	2330	228	2030	191	1130	160	669	175	2130
6	111	307	280	2480	226	2020	190	1080	159	665	178	2350
7	101	264	267	2370	225	2070	189	1020	158	662	181	2540
8	92	239	247	2150	224	2050	188	962	157	658	187	2770
9	81	213	229	1960	223	2040	187	932	156	654	251	3940
10	72	180	213	1800	221	1970	186	902	155	650	435	8690
11	64	155	200	1610	220	1960	184	871	155	647	711	17100
12	64	154	188	1390	219	1830	183	842	154	643	800	23100
13	66	162	180	1190	218	1760	182	812	153	639	774	25300
14	69	164	173	1120	216	1750	181	808	152	636	742	26100
15	72	173	172	1110	215	1680	180	784	151	632	711	24200
16	78	192	210	1610	214	1620	179	779	150	629	644	21200
17	198	610	256	2760	213	1610	178	794	149	625	559	18000
18	201	753	272	3080	211	1540	177	813	149	621	486	15200
19	203	827	281	3340	210	1530	176	809	148	618	414	12400
20	207	952	277	3290	209	1470	175	781	147	614	468	15700
21	212	1100	271	3080	208	1460	174	776	146	613	682	28600
22	214	1140	262	2830	207	1400	173	748	148	640	800	40400
23	216	1250	253	2590	206	1390	172	744	151	670	882	52900
24	234	1380	245	2450	204	1380	171	740	153	722	852	58400
25	206	1290	242	2310	203	1370	170	736	155	775	777	53300
26	237	1670	240	2270	202	1310	169	731	158	830	705	46100
27	249	1880	239	2260	201	1250	168	727	160	886	711	47200
28	258	1900	237	2240	200	1240	167	723	162	965	706	51500
29	266	1980	236	2160	199	1230	166	719	---	---	617	49000
30	267	2080	234	2150	198	1230	166	715	---	---	515	45900
31	266	2030	---	---	196	1220	165	711	---	---	438	45900
TOTAL	---	24833	---	66500	---	51700	---	26949	---	19167	---	745620

DAY	MEAN CONCENTRATION (MG/L)		LOAD (TONS/ DAY)		MEAN CONCENTRATION (MG/L)		LOAD (TONS/ DAY)		MEAN CONCENTRATION (MG/L)		LOAD (TONS/ DAY)		MEAN CONCENTRATION (MG/L)		LOAD (TONS/ DAY)	
	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER										
1	492	55900	95	5310	272	7860	445	16100	301	10100	82	722				
2	394	45400	93	4930	245	6690	438	16600	301	9260	77	657				
3	318	37500	101	5220	266	6980	433	15800	302	8140	73	551				
4	363	43700	114	5670	276	6830	401	13300	301	7370	73	503				
5	277	35200	127	6390	253	6000	381	11700	291	5850	75	501				
6	278	38900	128	6380	219	4920	363	10600	325	5920	77	503				
7	339	56600	138	6740	186	3990	344	9830	328	5610	79	504				
8	390	76500	136	6440	169	3470	310	8620	304	4950	81	500				
9	409	86600	126	5860	155	3030	305	8390	272	4050	80	489				
10	378	79500	120	5530	130	2420	380	10800	241	3300	79	474				
11	285	57500	117	5220	136	2420	370	10200	217	2850	78	461				
12	243	46000	114	4900	146	2420	360	9430	179	2240	77	426				
13	214	37400	111	4590	160	2470	365	9370	158	1920	76	394				
14	189	30100	110	4340	159	2320	432	12100	190	2250	75	385				
15	172	24900	125	4760	150	2050	451	13400	197	2260	74	366				
16	129	17100	132	4770	144	1880	418	12800	190	2140	73	345				
17	87	10700	136	4700	154	1840	432	12500	184	2080	72	323				
18	76	8770	141	4650	139	1540	494	13900	178	1940	71	301				
19	73	7990	147	4670	156	1720	438	11800	174	1890	70	294				
20	72	7420	150	4590	173	1890	403	10200	171	1870	68	280				
21	70	6900	135	3910	197	2220	423	10500	192	2280	67	265				
22	71	6600	139	3750	230	2590	913	27900	134	1980	65	257				
23	77	6760	157	4070	272	3220	584	19100	120	1700	64	257				
24	81	6710	200	5180	390	6030	427	13100	119	1500	62	256				
25	91	7060	267	7990	525	9630	447	13800	118	1370	61	252				
26	98	7090	353	11500	452	9580	539	18900	123	1300	60	248				
27	101	6940	420	13900	480	10500	547	21900	127	1260	58	235				
28	103	6680	389	12300	467	9710	446	18500	113	1010	57	228				
29	104	6370	335	10100	460	12700	352	14700	99	847	56	218				
30	100	5900	313	9460	452	14900	322	13100	91	770	55	202				
31																

MINNESOTA RIVER BASIN

05325000 MINNESOTA RIVER AT MANKATO, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
MAR									
18...	1445	12000	790	7.5	0.5	756	11.4	80	0.350
28...	1530	27500	537	7.9	3.5	733	10.8	85	0.310
APR									
04...	1400	44900	486	7.9	6.5	735	10.6	90	0.310
10...	1545	78100	588	8.1	2.5	740	10.8	82	0.310
16...	1400	49300	562	7.7	4.0	751	--	--	--
24...	1300	30900	624	8.1	11.0	748	10.2	94	0.075
MAY									
01...	1210	21000	719	8.6	12.5	742	12.0	115	<0.015
08...	1210	17800	718	8.5	14.0	743	12.0	119	<0.015
14...	1500	14700	786	8.5	11.0	742	10.9	102	0.016
21...	1400	10800	803	8.3	16.0	754	11.3	116	0.024
28...	1425	11800	803	8.2	14.0	747	9.3	93	0.015
JUN									
04...	1410	9250	821	8.2	20.0	744	9.3	106	0.029
10...	1530	6960	911	8.3	22.5	749	9.2	109	<0.015
17...	1345	4390	862	8.3	23.0	740	9.2	111	<0.015
26...	1245	7820	778	8.0	24.5	748	--	--	0.021
JUL									
03...	1415	13500	757	7.8	20.0	737	8.4	96	--
09...	1400	10400	836	8.0	20.0	748	8.0	90	0.019
15...	1430	11300	746	8.0	23.0	743	7.2	87	<0.015
22...	1450	11500	626	7.8	24.5	746	8.9	110	0.024
29...	1510	15600	712	8.0	24.5	751	--	--	0.016
AUG									
04...	1510	9540	946	8.0	27.0	746	6.6	84	0.030
11...	1420	5530	806	8.3	23.0	748	7.3	87	0.088
21...	1340	5140	795	8.3	21.0	749	9.2	106	<0.015
27...	1030	4470	910	7.9	23.5	744	7.9	95	<0.015

MINNESOTA RIVER BASIN

05325000 MINNESOTA RIVER AT MANKATO, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-P PHYTO- PLANK- TON CHROMO FLUORO14 (UG/L) (70954)
MAR								
18...	0.080	5.40	0.260	0.170	94	17	--	--
28...	0.060	5.20	0.560	0.150	190	22	1.30	<0.100
APR								
04...	0.070	3.50	--	0.170	--	--	E0.550	<0.100
10...	0.070	2.60	0.230	0.130	120	28	1.18	<0.100
16...	--	--	--	--	58	36	0.830	<0.100
24...	0.033	3.01	0.198	0.116	42	8	4.74	0.590
MAY								
01...	0.015	1.91	0.172	0.032	38	11	13.0	E0.590
08...	0.014	2.09	0.117	<0.010	45	11	8.60	<0.100
14...	0.027	2.27	0.046	<0.010	61	22	7.90	<0.100
21...	0.018	1.69	0.105	<0.010	75	10	3.10	<0.100
28...	0.031	7.17	0.249	0.036	125	23	4.30	<0.100
JUN								
04...	0.022	5.46	0.038	0.016	109	23	21.0	0.600
10...	0.019	3.71	0.049	0.012	84	14	33.0	1.20
17...	0.018	3.77	0.109	<0.010	46	14	20.0	1.30
26...	0.043	7.13	0.109	0.063	--	--	16.0	0.340
JUL								
03...	--	--	--	--	169	21	5.80	0.290
09...	0.055	5.57	0.312	0.099	116	30	10.0	0.360
15...	0.031	6.76	0.378	0.101	204	44	11.0	0.470
22...	0.035	9.90	0.412	0.117	672	80	9.10	E0.920
29...	0.056	5.94	0.346	0.141	97	16	7.10	0.520
AUG								
04...	0.037	4.99	0.235	0.115	124	22	21.0	1.80
11...	0.022	3.29	0.270	0.108	93	14	3.70	0.500
21...	0.016	2.43	0.206	0.061	80	8	10.0	E0.350
27...	0.015	2.77	0.208	0.075	71	10	17.0	1.40

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MINNESOTA RIVER BASIN

05327000 HIGH ISLAND CREEK NEAR HENDERSON, MN

LOCATION.--Lat 44°34'19", long 93°55'18", in NE¼NW¼ sec. 26, T.113 N., R.26 W., Sibley County, Hydrologic Unit 07020012, on left bank 20 ft downstream from bridge on County Road 6, 1.6 mi upstream from mouth, and 3.1 mi north of Henderson.

DRAINAGE AREA.--237 mi².

PERIOD OF RECORD.--October 1973 to current year. May 1970 to September 1973, operated as a low-flow station only.

REVISED RECORDS.--WDR-MN-80-2: 1974-75, 1977-79.

GAGE.--Water-stage recorder. Datum of gage is 728.56 ft above mean sea level.

REMARKS.--Records good except those for estimated daily discharges, which are fair to poor.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 300 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 27	2300	1840	8.16	July 22	1200	2430	9.01
Apr. 04	2000	1400	7.95	July 25	0800	*2830	*9.31
June 29	1300	1520	7.77	Aug. 02	1600	912	6.14
July 14	0200	900	6.51	Aug. 20	1100	1020	7.10

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.6	4.9	e29	e10	e9.8	e13	784	150	51	667	603	171
2	2.4	4.2	e28	e10	10	e14	834	147	47	602	767	155
3	2.1	3.9	e24	11	e9.8	15	1100	141	46	606	822	138
4	2.3	4.0	e22	e11	10	15	1350	130	44	578	699	124
5	2.3	7.7	23	e11	9.8	e15	1300	136	41	559	561	114
6	2.4	6.9	24	e10	9.9	e15	1130	128	39	545	492	105
7	2.5	6.3	e21	e10	10	e15	1000	129	38	526	391	96
8	2.2	5.6	21	e9.8	e9.8	e15	e960	127	37	478	296	91
9	2.2	5.3	20	e9.8	e9.8	16	e940	119	33	388	238	85
10	2.2	4.7	e19	e9.6	9.8	20	e900	114	31	292	198	81
11	2.5	4.3	e18	e9.4	e9.8	26	e820	106	29	223	170	79
12	2.8	3.8	e17	e9.2	e9.8	31	e680	95	26	176	151	74
13	2.8	4.2	e16	e9.0	e9.8	31	e600	94	25	291	138	71
14	3.0	3.9	e16	e9.0	e10	e32	e540	94	23	705	134	66
15	3.7	5.6	e16	e9.0	e10	e31	e500	87	22	408	138	61
16	3.9	32	e15	e9.2	e10	e30	495	86	21	273	e130	71
17	25	77	e15	e9.4	10	27	434	86	20	214	e122	77
18	11	61	e15	e9.6	e10	27	389	81	18	175	e114	79
19	4.7	43	e14	e9.8	e11	33	352	76	20	148	250	e80
20	3.5	33	e13	e10	11	50	324	74	18	134	926	e78
21	3.0	28	e13	e11	e11	140	298	67	15	145	708	e75
22	2.8	e30	e12	e11	e11	225	272	61	13	1350	565	76
23	5.8	e35	e12	e10	e12	223	252	55	11	935	536	83
24	4.7	e47	e12	e9.6	e12	236	231	57	11	708	506	e82
25	4.0	50	e11	e9.4	e12	214	211	52	9.6	2070	476	e80
26	4.0	35	e10	e9.2	12	347	194	50	7.4	1270	433	e77
27	3.6	31	e9.8	e9.0	12	945	177	48	6.1	852	355	e70
28	3.4	27	e9.8	e9.2	e12	1580	164	46	39	686	276	68
29	3.8	26	e9.8	e9.2	---	1070	158	52	1290	628	216	e70
30	5.6	29	e9.8	e9.4	---	989	154	54	965	597	191	e72
31	5.4	---	e9.8	e9.6	---	849	---	56	---	583	184	---
TOTAL	132.2	659.3	505.0	302.4	294.1	7289	17543	2798	2996.1	17812	11786	2649
MEAN	4.26	22.0	16.3	9.75	10.5	235	585	90.3	99.9	575	380	88.3
MAX	25	77	29	11	12	1580	1350	150	1290	2070	926	171
MIN	2.1	3.8	9.8	9.0	9.8	13	154	46	6.1	134	114	61
AC-FT	262	1310	1000	600	583	14460	34800	5550	5940	35330	23380	5250
CFSM	.02	.09	.07	.04	.04	.99	2.47	.38	.42	2.42	1.60	.37
IN.	.02	.10	.08	.05	.05	1.14	2.75	.44	.47	2.80	1.85	.42

e Estimated

MINNESOTA RIVER BASIN

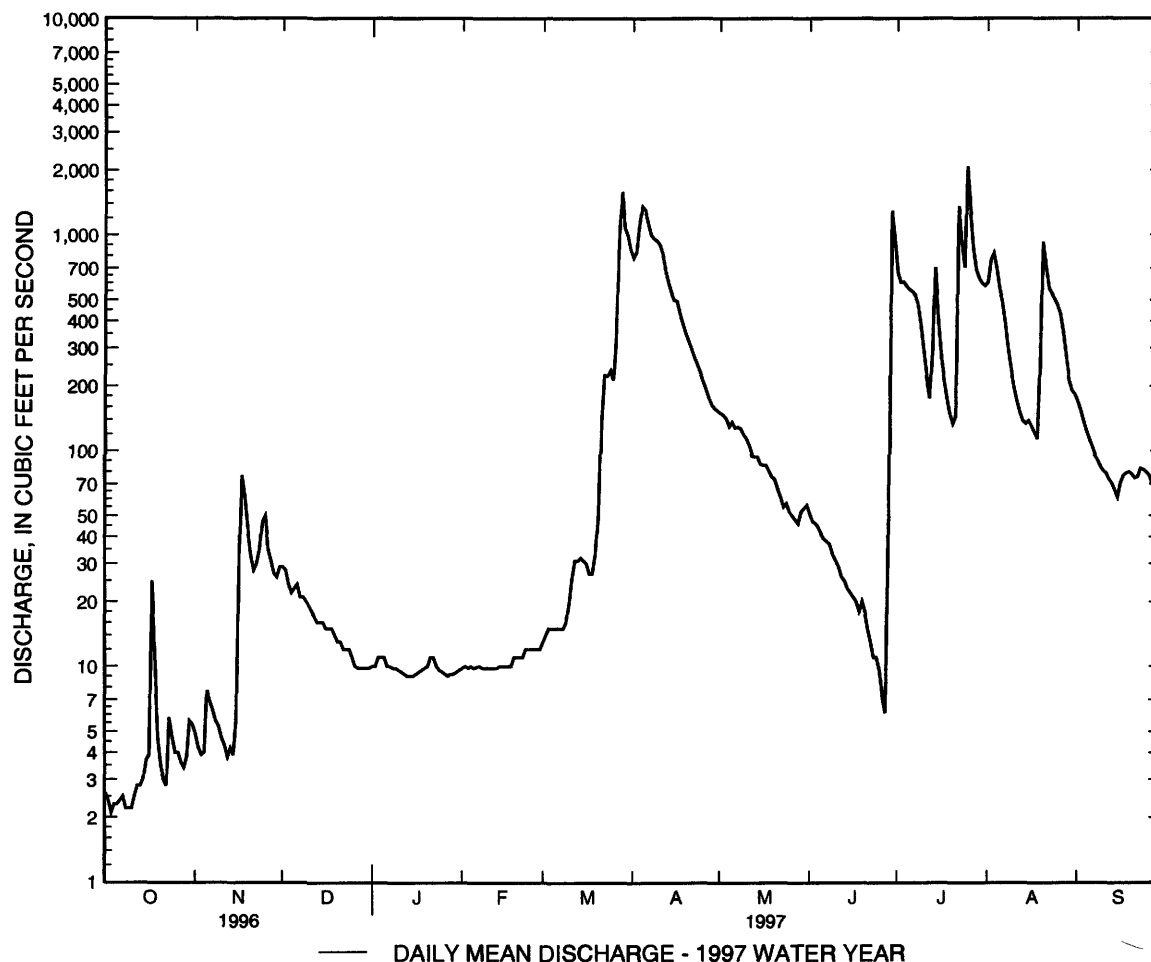
05327000 HIGH ISLAND CREEK NEAR HENDERSON, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	78.4	65.7	36.6	16.0	21.2	171	257	156	171	138	86.4	109
MAX	298	219	111	72.5	121	547	593	506	991	989	380	592
(WY)	1986	1993	1983	1992	1984	1992	1983	1993	1993	1993	1997	1991
MIN	1.51	2.11	1.37	.98	1.28	6.27	6.69	3.32	1.58	.80	1.16	1.18
(WY)	1990	1990	1976	1977	1989	1975	1990	1976	1976	1976	1976	1974

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1974 - 1997
ANNUAL TOTAL	28909.8	64766.1	
ANNUAL MEAN	79.0	177	109
HIGHEST ANNUAL MEAN			346
LOWEST ANNUAL MEAN			9.23
HIGHEST DAILY MEAN	680	Mar 25	2070
LOWEST DAILY MEAN	1.9	Sep 2	2.1
ANNUAL SEVEN-DAY MINIMUM	2.0	Aug 30	2.3
INSTANTANEOUS PEAK FLOW			2830
INSTANTANEOUS PEAK STAGE			9.31
INSTANTANEOUS LOW FLOW			2.0
ANNUAL RUNOFF (AC-FT)	57340	128500	79020
ANNUAL RUNOFF (CFSM)	.33	.75	.46
ANNUAL RUNOFF (INCHES)	4.54	10.17	6.25
10 PERCENT EXCEEDS	246	602	309
50 PERCENT EXCEEDS	18	35	31
90 PERCENT EXCEEDS	2.7	5.4	1.9

a Result of freezeup.



MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN

LOCATION.--Lat 44°41'35", long 93°38'30", in NW¼SW¼ sec. 7, T.114 N., R.23 W., Carver County, Hydrologic Unit 07020012, on pier at center downstream side of bridge, 1.5 mi northwest of Jordan, and at mile 39.4 upstream from Mississippi River.

DRAINAGE AREA.--16,200 mi², approximately.

PERIOD OF RECORD.--September 1934 to current year. Prior to Oct. 1, 1966, published as "near Carver, Minn".

REVISED RECORDS.--WSP 955: Drainage area. WSP 1508: 1935. WDR MN-87-2: 1976 (cal. yr. summary).

GAGE.--Water-stage recorder. Datum of gage is 690.00 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1966, water-stage recorder 2.8 mi downstream with auxiliary nonrecording gage at present site and present datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1370	3040	e3900	e2800	e1900	e2100	34200	23800	12300	15100	21000	4660
2	1400	3090	e3800	e2750	e1900	e2500	36900	22800	12000	16000	19900	4800
3	1370	3170	e3800	e2750	e1900	e3000	39000	21900	11500	16300	18600	4590
4	1330	3250	e3800	e2750	e1900	e3600	40200	21200	10900	16300	16600	4170
5	1280	3270	e3800	e2750	e1890	e4100	41200	20600	10200	15700	13900	3790
6	1270	3370	e3900	e2700	e1890	e4600	42700	20000	9650	14600	11500	3580
7	1240	3430	e4000	e2650	e1880	e5300	45200	19700	9140	13300	9750	3450
8	1190	3470	e4000	e2600	e1880	e6000	50600	19700	8710	12300	8610	3360
9	1150	3420	e4000	e2550	e1870	e6600	60600	19400	8330	11600	7810	3270
10	1140	3370	e3900	e2500	e1860	7220	72300	19100	7900	11200	7140	3160
11	1110	3300	e3900	e2500	e1850	e8300	79600	18700	7590	11200	6480	3090
12	1090	3210	e3800	e2450	e1850	e9600	81900	18400	7250	11000	6120	3040
13	1080	3040	e3800	e2400	e1840	e11000	80400	18000	6790	10800	5800	2930
14	1070	2760	e3700	e2380	e1840	e12000	76300	17500	6340	11300	5590	2750
15	1080	e3000	e3700	e2300	e1830	e12500	70000	16900	6010	12200	5540	2670
16	1060	e3500	e3550	e2250	e1830	e12600	63000	16200	5660	12600	5600	2710
17	1210	3820	e3400	e2250	e1850	e12600	56100	15400	5370	12700	5380	2780
18	1360	e4300	e3350	e2250	e1900	e12700	50200	14700	5040	12300	5240	2660
19	1590	e4500	e3250	e2300	e1900	e12800	45300	13800	4680	11900	5430	2500
20	1730	e4600	e3200	e2250	e1950	e13000	41500	13100	4600	11600	8250	2380
21	1860	e4700	e3100	e2200	e1950	e15000	38600	12500	4530	10800	9270	2310
22	2050	e4500	e3050	e2200	e1960	e17000	36200	11700	4570	12300	8620	2240
23	2250	e4300	e3000	e2150	e1950	e19500	34100	11000	4610	16400	8740	2220
24	2340	e4200	e3000	e2100	e1950	20600	32200	10400	4630	17600	8390	2240
25	2480	e4100	e2950	e2050	e1970	22400	30500	10300	5730	18200	7470	2260
26	2520	e4100	e2900	e2000	e1980	24900	29300	11200	6770	19900	6780	2290
27	2740	e4100	e2850	e2000	e2000	26800	28200	12300	7720	21600	6110	2290
28	2930	e4100	e2800	e1950	e2050	28400	27100	13000	8130	22200	5560	2290
29	2990	e4100	e2800	e1900	---	29500	26000	13100	9470	22300	5020	2210
30	3000	e4000	e2800	e1900	---	30900	25000	12700	13100	22100	4790	2150
31	3010	---	e2800	e1900	---	32400	---	12400	---	21600	4630	---
TOTAL	53290	111110	106600	72480	53320	429520	1414400	501500	229220	465000	269620	88840
MEAN	1719	3704	3439	2338	1904	13860	47150	16180	7641	15000	8697	2961
MAX	3010	4700	4000	2800	2050	32400	81900	23800	13100	22300	21000	4800
MIN	1060	2760	2800	1900	1830	2100	25000	10300	4530	10800	4630	2150
AC-FT	105700	220400	211400	143800	105800	852000	2805000	994700	454700	922300	534800	176200
CFSM	.11	.23	.21	.14	.12	.86	2.91	1.00	.47	.93	.54	.18
IN.	.12	.26	.24	.17	.12	.99	3.25	1.15	.53	1.07	.62	.20

e Estimated

MINNESOTA RIVER BASIN

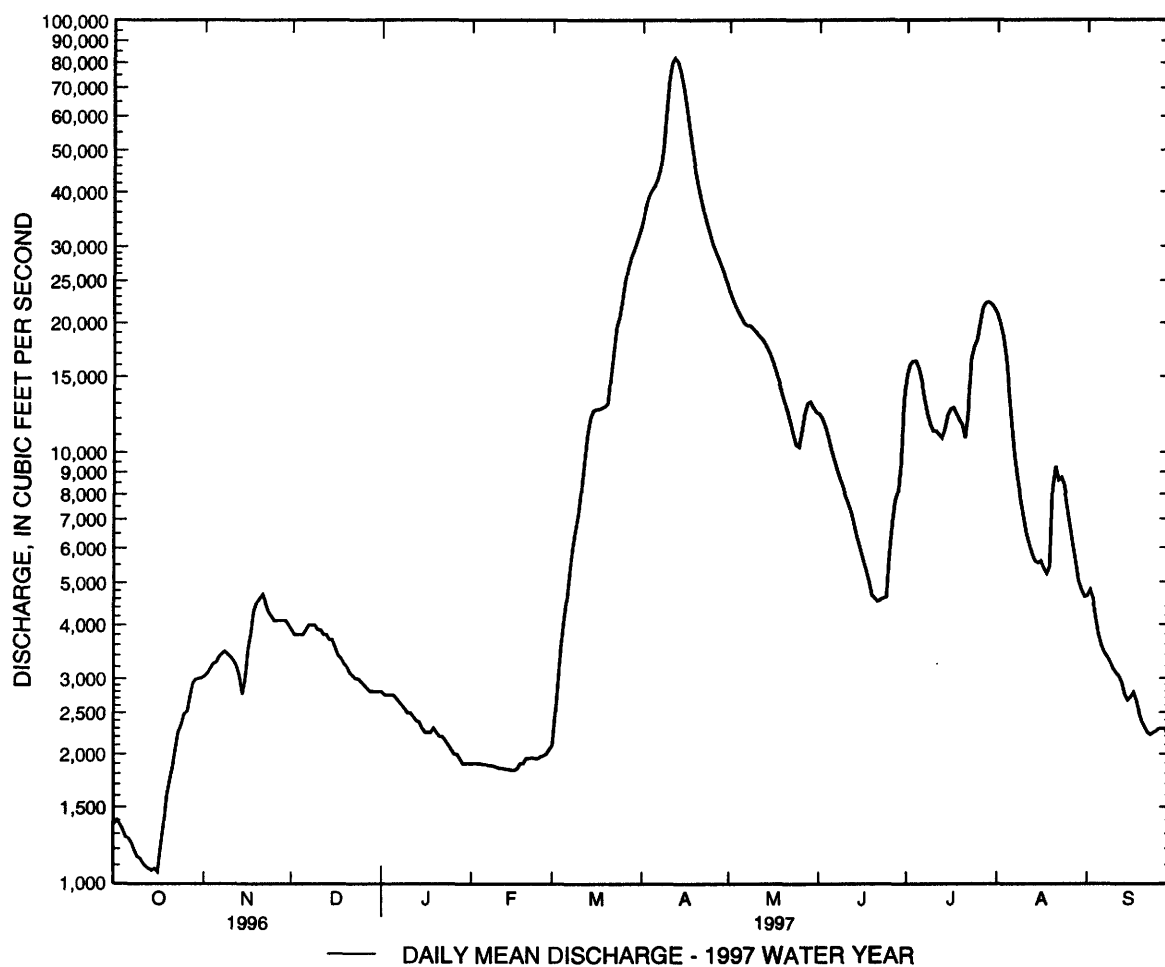
05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1935 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	2230	2152	1497	911	955	5219	12250	7906	7630	5871	3354	2308
MAX	16030	9463	5216	3344	3992	21170	48210	25510	41460	38640	25660	14460
(WY)	1969	1996	1983	1992	1983	1983	1969	1993	1993	1993	1993	1993
MIN	167	178	158	111	130	322	926	923	633	279	178	183
(WY)	1935	1935	1977	1940	1940	1940	1959	1959	1976	1936	1936	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1935 - 1997
ANNUAL TOTAL	2271680	3794900	
ANNUAL MEAN	6207	10400	4363 ^a
HIGHEST ANNUAL MEAN			16910
LOWEST ANNUAL MEAN			687
HIGHEST DAILY MEAN	31200	Jun 23	81900
LOWEST DAILY MEAN	1060	Oct 16	1060
ANNUAL SEVEN-DAY MINIMUM	1090	Oct 10	1090
INSTANTANEOUS PEAK FLOW		82300	Apr 12
INSTANTANEOUS PEAK STAGE		32.24	Apr 12
INSTANTANEOUS LOW FLOW		1060	Oct 14
ANNUAL RUNOFF (AC-FT)	4506000	7527000	3161000
ANNUAL RUNOFF (CFSM)	.38	.64	.27
ANNUAL RUNOFF (INCHES)	5.22	8.71	3.66
10 PERCENT EXCEEDS	13500	24200	11700
50 PERCENT EXCEEDS	3360	4570	1800
90 PERCENT EXCEEDS	1500	1900	308

a Median of annual mean discharges is 3483 ft³/s.



MINNESOTA RIVER BASIN

05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued
(National Water-Quality Assessment Station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1952-63-69, 1972 to current year. NASQAN site prior to 1996.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: June 1996 to current year.

SPECIFIC CONDUCTANCE: June 1996 to current year.

INSTRUMENTATION.--Electronic data logger and water temperature/ specific conductance probe since June 1996, provides continuous recordings. Sensor located at gage.

REMARKS.--Records represent water temperature at sensor within 0.5 °C. Temperature and conductance at the sensor was compared with water-quality instruments at least monthly. Variation of temperature was within 0.5 °C; variation of conductance was within 14% (corrections applied).

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum, 27.5 °C, July 18, 1997; minimum, 0.0 °C, on many days during winter.

SPECIFIC CONDUCTANCE: Maximum, 1080 µs/cm, Feb. 20, 21, 1997; minimum, 484 µs/cm, July 26, 1997.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum, 27.5 °C, July 18; minimum, 0.0 °C, on many days during winter.

SPECIFIC CONDUCTANCE: Maximum, 1080 µs/cm, Feb. 20, 21; minimum, 484 µs/cm, July 26.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	16.7	15.1	15.8	5.6	4.4	5.0	.5	.5	.5	.5	.5	.5
2	16.7	15.3	15.9	4.4	3.4	3.8	.5	.5	.5	.5	.5	.5
3	15.3	14.1	14.6	3.7	2.9	3.3	.5	.5	.5	.5	.5	.5
4	14.4	13.7	13.9	3.9	3.3	3.5	.5	.5	.5	.5	.5	.5
5	15.2	13.5	14.2	4.5	3.9	4.2	.5	.5	.5	.5	.5	.5
6	15.2	14.5	14.8	4.7	4.5	4.6	.5	.5	.5	.5	.5	.5
7	14.7	13.9	14.2	4.9	4.2	4.5	.5	.5	.5	.5	.5	.5
8	13.9	13.0	13.6	4.7	4.4	4.5	.5	.5	.5	.5	.5	.5
9	13.9	12.8	13.5	4.4	3.6	3.9	.5	.0	.5	.5	.5	.5
10	13.1	12.2	12.6	3.6	2.5	2.9	.0	.0	.0	.5	.5	.5
11	12.9	11.7	12.3	2.5	1.5	2.0	.0	.0	.0	.5	.5	.5
12	13.6	12.0	12.7	1.5	.7	.9	.5	.0	.0	.5	.5	.5
13	14.2	12.6	13.2	.9	.5	.6	.5	.0	.0	.5	.0	.5
14	14.2	13.0	13.5	.5	.2	.3	.5	.0	.0	.5	.5	.5
15	15.2	13.7	14.4	.4	.2	.2	.5	.0	.0	.5	.5	.5
16	15.4	13.8	14.5	1.4	.3	.7	.5	.0	.0	.5	.5	.5
17	14.9	12.9	14.3	1.4	1.2	1.3	.5	.0	.0	.5	.0	.5
18	12.9	11.5	12.1	1.6	1.2	1.4	.5	.0	.5	.5	.5	.5
19	11.8	10.9	11.3	1.3	.2	.5	.5	.0	.5	.5	.5	.5
20	11.2	10.5	10.9	.3	.2	.2	.5	.0	.5	.5	.5	.5
21	11.3	10.5	10.8	.4	.2	.3	.5	.5	.5	.5	.5	.5
22	10.6	9.7	10.2	.4	.3	.3	.5	.5	.5	.5	.5	.5
23	9.7	8.9	9.3	.4	.3	.4	.5	.5	.5	.5	.5	.5
24	8.9	8.1	8.5	.4	.2	.3	.5	.0	.5	.5	.5	.5
25	8.8	8.1	8.4	.3	.2	.3	.5	.0	.0	.5	.5	.5
26	10.0	8.8	9.3	.3	.2	.2	.5	.0	.5	.5	.5	.5
27	10.1	9.8	9.9	.4	.2	.3	.5	.0	.5	.5	.5	.5
28	10.0	9.4	9.7	.4	.3	.4	.5	.5	.5	.5	.5	.5
29	10.0	9.6	9.7	.4	.3	.4	.5	.5	.5	.5	.5	.5
30	9.7	7.5	8.6	.4	.3	.4	.5	.5	.5	.5	.5	.5
31	7.5	5.6	6.4	---	---	---	.5	.5	.5	.5	.5	.5
MONTH	16.7	5.6	12.0	5.6	.2	1.7	.5	.0	.4	.5	.0	.5

MINNESOTA RIVER BASIN
05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	.5	.5	.5	.5	.5	.5	6.5	5.0	5.5	12.9	11.9	12.3
2	.5	.5	.5	.5	.5	.5	7.0	6.5	6.5	13.1	12.7	12.9
3	.5	.5	.5	.5	.5	.5	7.5	6.5	7.0	12.9	12.2	12.6
4	.5	.5	.5	.5	.0	.0	7.5	7.0	7.5	13.4	12.3	12.8
5	.5	.5	.5	.0	.0	.0	8.0	7.5	8.0	14.3	13.4	13.8
6	.5	.5	.5	.0	.0	.0	8.0	6.5	7.5	14.7	13.9	14.3
7	.5	.5	.5	.0	.0	.0	6.5	5.0	5.5	14.9	14.4	14.7
8	.5	.5	.5	.0	.0	.0	5.0	4.0	4.5	14.4	13.7	14.1
9	.5	.5	.5	.0	.0	.0	4.5	4.0	4.0	13.8	13.1	13.5
10	.5	.5	.5	.0	.0	.0	4.0	3.5	4.0	14.5	13.7	14.0
11	.5	.5	.5	.0	.0	.0	3.5	3.0	3.5	14.7	14.2	14.6
12	.5	.5	.5	.0	.0	.0	3.0	3.0	3.0	14.2	13.1	13.5
13	.5	.5	.5	.0	.0	.0	3.5	2.5	3.0	13.2	12.7	12.9
14	.5	.5	.5	.0	.0	.0	4.0	3.0	3.5	12.8	11.7	12.2
15	.5	.5	.5	.0	.0	.0	4.5	4.0	4.0	11.7	11.0	11.3
16	.5	.5	.5	.0	.0	.0	5.0	4.0	4.5	12.1	11.1	11.5
17	.5	.5	.5	.5	.0	.0	5.5	4.5	5.0	13.6	12.1	12.6
18	.5	.5	.5	.0	.0	.0	6.0	5.0	5.5	15.2	13.6	14.2
19	.5	.5	.5	.0	.0	.0	7.0	5.5	6.5	15.6	15.2	15.3
20	.5	.5	.5	.0	.0	.0	8.5	7.0	7.5	16.0	15.4	15.6
21	.5	.5	.5	.0	.0	.0	9.5	8.0	9.0	16.0	15.5	15.8
22	.5	.5	.5	1.0	.0	.5	10.5	9.0	9.5	16.1	15.8	15.9
23	.5	.5	.5	1.5	.5	1.0	11.0	10.0	10.5	16.8	16.1	16.3
24	.5	.5	.5	1.5	.5	1.0	11.0	10.5	10.5	17.3	16.8	17.1
25	.5	.5	.5	1.0	.5	.5	11.5	10.5	11.0	17.3	16.8	17.1
26	.5	.5	.5	1.5	.5	1.0	12.0	11.5	11.5	16.8	16.1	16.3
27	.5	.5	.5	3.5	1.5	2.5	12.5	11.5	12.0	16.1	15.4	15.7
28	.5	.5	.5	4.0	3.5	4.0	13.0	12.0	12.5	15.4	14.4	15.0
29	---	---	---	5.0	4.0	4.5	14.0	13.0	13.5	14.4	13.6	14.0
30	---	---	---	5.0	4.5	5.0	14.0	12.5	13.5	14.6	13.4	13.8
31	---	---	---	5.5	4.0	4.5	---	---	---	15.8	14.4	14.9
MONTH	.5	.5	.5	5.5	.0	.8	14.0	2.5	7.3	17.3	11.0	14.2

MINNESOTA RIVER BASIN
05330000 MINNESOTA RIVER NEAR JORDAN, MN--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	17.3	15.7	16.4	22.5	21.0	21.5	23.5	23.0	23.0	23.5	20.5	22.0
2	18.7	17.2	17.9	22.5	22.0	22.0	24.0	23.0	23.5	21.5	18.0	19.0
3	19.9	18.7	19.2	22.0	20.5	21.0	25.0	24.0	24.5	23.0	16.0	19.5
4	---	---	---	20.5	19.5	20.0	25.5	24.5	25.0	22.5	21.5	22.0
5	---	---	---	20.0	19.5	19.5	25.5	25.0	25.0	22.0	21.0	21.5
6	---	---	---	20.5	19.5	20.0	25.0	24.5	25.0	22.5	21.0	22.0
7	---	---	---	20.0	20.0	20.0	25.0	24.0	25.0	22.5	21.0	22.0
8	---	---	---	20.0	19.5	19.5	25.0	24.0	24.5	22.5	21.0	22.0
9	---	---	---	20.5	19.5	20.0	25.0	23.5	24.5	22.5	19.5	22.0
10	---	---	---	21.0	20.5	21.0	24.5	22.5	23.5	22.5	18.5	21.5
11	---	---	---	22.0	21.0	21.0	23.5	21.5	23.0	22.5	18.5	21.0
12	---	---	---	23.0	22.0	22.5	23.0	21.0	22.5	22.0	18.0	21.0
13	---	---	---	24.5	23.0	23.5	22.5	20.5	22.0	22.0	18.0	20.5
14	---	---	---	25.0	24.0	24.5	22.0	20.0	21.5	22.0	18.0	21.0
15	---	---	---	25.0	24.0	24.5	23.0	20.0	22.0	22.5	18.5	21.5
16	---	---	---	26.0	25.0	25.5	23.5	21.0	23.0	22.5	18.5	21.0
17	---	---	---	27.0	26.0	26.5	24.0	21.5	23.0	22.0	18.0	21.0
18	---	---	---	27.5	27.0	27.0	22.5	21.0	22.0	23.5	18.0	21.5
19	---	---	---	27.0	26.0	26.5	22.0	19.5	21.5	23.0	18.0	21.5
20	---	---	---	26.5	25.5	26.0	20.5	18.5	20.0	22.0	17.0	20.0
21	---	---	---	27.0	26.0	26.5	20.5	18.5	19.5	20.5	16.0	19.5
22	---	---	---	27.0	23.5	25.5	21.5	20.0	20.5	20.5	15.0	18.5
23	---	---	---	24.0	22.5	23.0	22.0	20.5	21.5	20.0	14.0	18.0
24	---	---	---	23.5	23.0	23.0	22.5	21.5	22.0	20.0	14.0	18.0
25	---	---	---	23.5	23.0	23.0	23.0	21.5	22.5	20.5	14.5	18.5
26	---	---	---	24.0	23.0	23.5	---	---	---	21.0	15.0	19.0
27	26.1	25.0	25.6	24.5	24.0	24.5	---	---	---	21.5	16.0	19.5
28	26.1	24.8	25.7	24.5	24.5	24.5	24.0	22.0	23.5	21.0	16.0	19.5
29	25.6	22.9	24.5	24.5	24.0	24.0	22.5	20.0	21.5	20.5	15.5	18.5
30	23.8	21.6	22.5	24.0	23.5	24.0	23.0	20.5	22.0	22.0	14.5	19.5
31	---	---	---	24.0	23.0	23.5	23.0	20.0	21.5	---	---	---
MONTH	---	---	---	27.5	19.5	23.1	---	---	---	23.5	14.0	20.4

MINNESOTA RIVER BASIN

05330000- MINNESOTA RIVER NEAR JORDAN, MN--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	865	846	854	---	---	---	1040	1000	1020	1000	a970	997
2	---	---	---	---	---	---	1000	981	990	1000	a956	995
3	---	---	---	---	---	---	981	957	972	1000	a971	994
4	---	---	---	---	---	---	960	949	956	997	a965	989
5	---	---	---	---	---	---	951	943	948	990	a938	981
6	---	---	---	---	---	---	946	943	944	986	a945	975
7	---	---	---	---	---	---	956	944	951	972	951	960
8	---	---	---	---	---	---	962	952	958	952	947	950
9	887	866	878	972	953	963	970	959	964	949	946	947
10	866	841	848	997	971	982	973	963	969	948	941	944
11	848	832	837	998	985	991	982	969	976	945	940	943
12	857	841	846	1000	989	994	978	969	974	954	943	948
13	861	842	852	1010	1000	1010	978	970	975	964	953	960
14	862	847	855	1020	1010	1020	991	976	983	969	961	965
15	858	841	850	1030	1020	1030	991	977	985	979	966	975
16	852	836	844	1030	945	992	1000	987	993	984	975	980
17	843	793	811	945	876	921	1010	993	1000	987	982	985
18	809	787	800	876	821	843	1040	1000	1020	994	983	990
19	787	759	773	824	809	816	1040	1030	1030	999	992	995
20	825	774	797	818	803	808	1040	1020	1030	1000	994	995
21	828	737	784	826	818	821	1040	1020	1030	1000	997	1000
22	774	745	762	859	824	844	1040	1020	1030	1010	996	1010
23	822	774	796	867	857	862	1040	1030	1030	1010	997	1010
24	843	822	837	887	867	880	1040	1030	1030	1030	999	1010
25	867	838	851	917	886	899	1040	1020	1030	1030	999	1010
26	872	857	865	924	917	921	1030	a1000	1030	1010	a969	996
27	892	---	---	949	923	934	1030	a1010	1030	1010	1000	1010
28	---	---	---	959	947	954	1030	a1000	1030	1010	1000	1010
29	---	---	---	1020	953	992	1030	a1000	1020	1010	a991	1010
30	---	---	---	1050	1020	1040	1010	a1010	1010	1020	1000	1010
31	---	---	---	---	---	---	1010	995	1000	1020	1000	1020
MONTH	---	---	---	---	---	---	1040	943	997	1030	941	986

a Minimum observed.

MINNESOTA RIVER BASIN

05330000- MINNESOTA RIVER NEAR JORDAN, MN--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	1020	1000	1010	792	764	778	514	508	512	692	687	690
2	1020	1000	1010	764	746	755	508	491	499	693	689	692
3	1040	995	1010	762	752	758	491	486	488	695	692	694
4	1040	994	1020	764	751	758	490	486	488	698	693	696
5	1020	a991	1010	752	730	736	493	490	491	700	695	698
6	1020	a986	1010	738	725	731	495	491	493	698	693	696
7	1010	a982	1000	738	716	721	501	495	498	698	691	693
8	1010	a966	997	742	716	730	505	501	503	715	698	707
9	1010	a974	997	762	742	751	531	505	518	719	715	717
10	1040	1000	1020	776	762	772	536	523	528	722	718	719
11	1040	1010	1030	789	739	772	574	536	554	731	722	726
12	1040	1020	1030	740	630	698	584	574	582	739	730	735
13	1050	1030	1040	630	548	575	582	562	572	752	739	745
14	1050	1030	1050	548	526	534	563	557	558	774	752	765
15	1050	1030	1050	538	525	529	565	558	561	783	774	779
16	1060	1040	1050	566	538	551	572	565	568	788	782	785
17	1070	1040	1060	588	564	577	582	572	577	793	788	791
18	1070	1060	1070	615	588	597	593	582	588	797	792	794
19	1060	1040	1050	650	613	634	605	593	599	796	794	795
20	1080	1030	1050	665	639	659	615	605	610	795	792	794
21	1080	1040	1060	666	643	661	622	614	618	798	792	795
22	1060	1030	1040	652	594	626	628	621	625	806	797	801
23	1050	1030	1030	621	537	562	637	628	632	818	804	808
24	1040	1020	1030	537	526	531	645	636	640	829	808	815
25	1040	1000	1020	530	526	527	653	644	648	812	803	810
26	1020	971	990	546	530	539	659	652	656	803	788	799
27	971	867	925	552	546	550	665	659	662	789	775	779
28	867	790	825	548	537	542	675	665	669	794	777	784
29	---	---	---	537	531	534	683	674	679	807	794	802
30	---	---	---	531	515	528	687	683	685	817	805	811
31	---	---	---	522	514	515	---	---	---	824	812	818
MONTH	1080	790	1020	792	514	636	687	486	577	829	687	759

a Minimum observed.

MINNESOTA RIVER BASIN

05330000- MINNESOTA RIVER NEAR JORDAN, MN--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	827	814	820	673	631	656	718	679	698	---	---	---
2	837	824	830	705	673	691	758	716	739	---	---	---
3	851	835	840	722	705	716	789	757	773	---	---	---
4	---	---	---	753	720	732	816	788	802	790	781	784
5	---	---	---	766	753	762	845	815	833	795	785	790
6	---	---	---	796	763	776	843	822	835	799	789	794
7	---	---	---	807	785	800	847	835	842	807	796	803
8	---	---	---	785	766	770	851	839	847	814	802	809
9	---	---	---	782	768	778	855	840	849	822	801	814
10	---	---	---	804	780	790	856	838	849	828	796	820
11	---	---	---	813	803	810	873	842	862	833	798	822
12	---	---	---	811	801	805	873	838	858	827	785	815
13	---	---	---	805	801	803	847	834	843	830	793	820
14	---	---	---	809	787	802	850	837	846	834	802	824
15	---	---	---	787	769	779	849	830	844	856	803	835
16	---	---	---	770	754	759	842	823	838	859	816	844
17	---	---	---	763	755	759	852	826	842	835	806	827
18	---	---	---	762	755	759	851	827	844	839	806	827
19	---	---	---	766	749	761	837	707	816	843	816	834
20	---	---	---	765	747	754	755	620	687	850	821	839
21	---	---	---	770	762	766	664	612	638	864	828	850
22	---	---	---	770	609	722	717	662	693	867	831	852
23	---	---	---	639	536	571	739	716	724	859	825	847
24	---	---	---	615	550	576	749	733	742	862	830	849
25	---	---	---	624	523	602	778	737	755	869	837	857
26	---	---	---	541	484	503	---	---	---	868	836	854
27	788	744	762	584	517	554	804	784	794	868	833	853
28	801	785	792	584	564	573	---	---	---	868	836	857
29	811	702	788	598	564	577	---	---	---	865	818	846
30	740	640	691	643	598	622	---	---	---	869	823	855
31	---	---	---	679	643	662	---	---	---	---	---	---
MONTH	---	---	---	813	484	709	---	---	---	---	---	---

MINNESOTA RIVER BASIN

05330000- MINNESOTA RIVER NEAR JORDAN, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED SATUR- ATION) (00301)
OCT 08...	1023	1200	874	864	8.2	8.1	13.0	748	11.5	111
NOV 08...	1015	3500	948	966	8.2	8.2	4.5	--	12.2	96
DEC 09...	1200	6660	960	949	8.0	7.7	0.0	745	12.1	85
JAN 07...	1045	4070	942	951	7.4	7.8	0.0	756	9.1	63
FEB 10...	1030	1860	990	1010	7.4	7.8	0.0	762	9.8	67
MAR 04...	1000	5290	742	759	7.5	7.8	0.0	--	10.7	75
17...	1140	12600	556	565	7.6	7.5	0.0	749	11.4	80
APR 14...	1155	76500	552	549	7.9	7.6	3.5	750	12.1	92
22...	1230	36200	619	634	8.0	7.7	9.5	743	9.3	88
MAY 14...	1150	17500	760	770	8.4	8.1	12.0	7	10.8	103
JUN 04...	1100	10900	808	790	8.2	8.3	19.5	746	8.3	91
24...	1255	4590	819	792	8.2	8.2	25.0	738	7.4	92
JUL 01...	1212	15200	660	617	7.9	7.9	21.0	741	6.8	80
17...	1045	12700	763	731	8.1	8.2	26.0	745	6.5	82
AUG 13...	1135	5790	847	828	8.1	8.2	21.5	750	7.2	83
SEP 04...	1100	4070	784	768	8.1	8.3	21.5	757	8.2	94

MINNESOTA RIVER BASIN

05330000- MINNESOTA RIVER NEAR JORDAN, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
OCT										
08...	390	263	268	321	0	0.020	<0.010	0.40	1.5	0.130
NOV										
08...	450	217	287	265	0	0.030	0.030	0.60	1.1	4.00
DEC										
09...	490	309	327	377	0	0.220	0.030	0.80	0.80	7.30
JAN										
07...	420	316	329	386	0	0.320	0.040	0.80	0.80	5.70
FEB										
10...	460	350	354	427	0	0.400	0.060	0.80	1.0	4.70
MAR										
04...	370	256	261	312	0	0.390	0.050	1.0	1.4	5.10
17...	270	183	196	223	0	0.340	0.080	1.0	1.7	5.40
APR										
14...	250	145	153	177	0	0.333	0.065	0.63	1.4	3.13
22...	290	167	178	204	0	0.072	0.044	0.75	1.3	3.04
MAY										
14...	370	212	219	236	11	<0.015	0.020	0.48	1.3	2.33
JUN										
04...	400	252	263	307	0	<0.015	0.023	0.40	1.2	6.50
24...	390	247	260	301	0	0.029	0.023	0.40	1.1	4.02
JUL										
01...	310	221	203	270	0	<0.015	0.082	0.82	2.1	10.3
17...	380	233	243	284	0	<0.015	0.028	0.62	1.5	6.96
AUG										
13...	410	255	278	311	0	<0.015	0.019	0.68	1.5	3.45
SEP										
04...	370	267	270	323	1	<0.015	0.019	0.53	1.3	2.95

MINNESOTA RIVER BASIN
05330000- MINNESOTA RIVER NEAR JORDAN, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)
OCT 08...	0.100	<0.010	<0.010	4.9	>5.0	82	45	35	0.8	4.8
NOV 08...	0.200	0.050	0.050	6.0	3.9	100	49	27	0.6	5.0
DEC 09...	0.080	0.080	0.080	5.3	0.50	120	47	20	0.4	3.8
JAN 07...	0.100	0.080	0.090	5.0	0.40	100	42	25	0.5	3.7
FEB 10...	0.090	0.090	0.100	4.9	0.20	110	46	28	0.6	4.2
MAR 04...	0.220	0.130	0.170	6.3	1.1	91	34	18	0.4	4.3
17...	0.360	0.180	0.170	7.3	2.7	70	24	8.8	0.2	4.2
APR 14...	0.307	0.112	0.113	6.3	2.8	60	24	9.0	0.2	4.8
22...	0.202	0.119	0.109	6.3	1.0	68	28	11	0.3	5.1
MAY 14...	0.111	<0.010	<0.010	6.2	2.2	83	40	16	0.4	4.8
JUN 04...	0.150	0.047	0.032	4.9	3.2	94	40	15	0.3	3.7
24...	0.151	0.010	0.032	5.7	3.1	88	41	19	0.4	4.3
JUL 01...	0.600	0.182	0.145	6.6	2.0	77	29	10	0.2	3.7
17...	0.309	0.119	0.112	5.6	1.8	92	37	13	0.3	3.6
AUG 13...	0.299	0.127	0.115	6.4	4.6	97	41	17	0.4	4.4
SEP 04...	0.206	0.076	0.076	6.7	3.2	84	38	17	0.4	4.3

MINNESOTA RIVER BASIN

05330000- MINNESOTA RIVER NEAR JORDAN, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
08...	39	160	0.30	13	<3.0	38	562	538	56	75
NOV										
08...	28	210	0.40	14	<3.0	10	653	582	182	66
DEC										
09...	27	160	0.40	21	7.0	17	646	617	114	57
JAN										
07...	34	140	0.40	20	<3.0	41	631	581	145	18
FEB										
10...	34	150	0.40	23	8.0	110	662	627	168	39
MAR										
04...	23	110	0.30	20	9.0	37	490	478	87	62
17...	16	65	0.30	17	12	49	355	340	233	66
APR										
14...	9.9	110	0.26	15	8.7	14	362	331	119	98
22...	10	130	0.25	16	4.0	11	411	380	61	91
MAY										
14...	15	170	0.28	5.7	4.0	5.1	517	473	138	74
JUN										
04...	19	130	0.41	13	<3.0	<1.0	538	496	--	--
24...	22	140	0.33	13	<3.0	1.7	538	493	232	80
JUL										
01...	15	79	0.38	22	<3.0	<1.0	455	416	595	91
17...	17	110	0.40	23	<3.0	<1.0	536	470	339	90
AUG										
13...	20	150	0.40	24	<3.0	4.1	677	518	223	95
SEP										
04...	21	110	0.36	22	<3.0	1.3	522	475	--	--

UPPER MISSISSIPPI RIVER BASIN

05331000 MISSISSIPPI RIVER AT ST. PAUL, MN

LOCATION.--LAT 44°56'40", long 93°05'20", inSE 1/4 NE 1/4 sec. 6, T. 28 N., R. 22 W., Ramsey County, Hydrologic Unit 07010206, on left bank in St. Paul, 300 ft upstream from Robert Street Bridge, 6 mi downstream from Minnesota River, and at mile 839.3 upstream from Ohio River.

DRAINAGE AREA.--36,800 mi², approximately.

PERIOD OF RECORD.--Water year 1867-69, 1872-92 (annual maximums), March 1892 to current year (prior to 1901, fragmentary during some winters). Records prior to March 1892, published in the 19th Annual Report, Part 4, have been found to be unreliable and should not be used. Monthly discharge only for some periods, published in WSP 1308. Gage-height records (winter records incomplete) collected at same site since 1866 are contained in reports of U.S. Weather Bureau, War Department and Mississippi River Commission.

REVISED RECORDS.--WSP 285: 1892-96. WSP 715: Drainage area. WSP 875: 1938. WSP 895: 1939. WSP 1308: 1867(M). WSP 1506: 1897, 1898(M). 1903(M), 1917-18(M). 1928(M), 1929. WRD MN-74: 1973.

GAGE.--Water-stage recorder. Datum of gage is 683.62 ft above mean sea level. Prior to Mar. 18, 1925, nonrecording gage at several sites within 300 ft of present site at present datum. Since September 1938, auxiliary water-stage recorder 5.6 mi downstream.

REMARKS.--Records good. Slight regulation except during extreme floods by reservoirs on headquarters and by power plants. Beginning July 27, 1939, sewage from Minneapolis and St. Paul, which formerly entered above station, was diverted to a sewage-disposal plant, thence to river below station. Figures do not include this diversion.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4670	11900	e14500	e9640	e7470	e8620	52200	55300	22800	31000	42600	14500
2	4570	12400	e14000	e9800	e8720	e8580	57000	53400	21600	33800	41200	13500
3	4950	12800	e13700	e10100	e8710	e8260	64400	51500	20900	32800	40300	12900
4	4910	12900	e13300	e9990	e8600	e8690	72500	49800	20000	33400	38600	11800
5	5120	13500	e13500	e10300	e8200	e9520	80800	47600	18900	34200	35100	11300
6	4980	13800	e14700	e9510	e8470	e9890	89400	46200	18000	34800	31500	11000
7	4970	14400	e15000	e8790	e8800	e10000	96200	45000	17300	35200	28100	10900
8	5030	14400	e14600	e8850	e8600	e11600	104000	44300	16500	35700	20300	10700
9	4810	14000	e13900	e8230	e8190	e12800	111000	41700	15500	34800	19300	10200
10	4810	14500	e14200	e7910	e8240	e13400	120000	40000	15300	34200	18100	10000
11	4920	14200	e14600	e7860	e8280	e14200	128000	40100	14800	34600	17200	10100
12	4840	14000	e14700	e7150	e8200	e15000	133000	38300	13600	33900	16200	9710
13	4780	13100	e15100	e6670	e8140	e15600	133000	37800	13100	33500	15500	9330
14	4420	12400	e14600	e6950	e8150	e16400	130000	37500	12400	34500	15300	9660
15	4660	e11500	e13800	e7150	e8490	e16900	124000	36000	12400	33600	15000	10200
16	4110	e10700	e12500	e8000	e8150	e17800	117000	34600	11600	33700	14500	10500
17	4720	e10500	e11800	e9670	e8020	e19100	109000	33600	11200	36000	13900	10100
18	5140	e13400	e12000	e8380	e8010	e19900	102000	32200	10800	33800	14800	9860
19	5750	e14000	e11400	e8560	e8130	e20700	95100	30800	10700	33300	18700	9680
20	5890	e14400	e10100	e8310	e7940	e22000	89800	29700	10400	32700	20400	9330
21	5930	e15500	e9130	e8330	e8520	e23200	84900	28500	10100	31000	19300	9610
22	7460	e15800	e9580	e8490	e8430	e24700	80700	27000	10600	33800	19400	9600
23	7990	e15200	e11100	e8810	e8360	25600	77100	22700	10400	36100	19600	9040
24	8590	e15300	e10700	e8780	e8090	27800	73800	22900	12100	37000	18700	8900
25	9520	e14900	e10500	e8510	e8220	28000	70600	24000	13200	38800	17700	9370
26	9720	e13900	e9980	e8640	e8160	29300	67600	25000	14700	40500	17100	8780
27	9820	e12600	e10100	e8420	e8510	31800	65000	25300	15600	41500	16500	8890
28	10100	e12000	e10400	e8540	e8390	35500	62500	25300	18100	42300	15900	8860
29	10500	e12900	e10800	e8610	---	39500	59800	25000	21600	42800	15500	8210
30	10700	e13400	e10900	e8530	---	43500	57400	24300	26700	43000	14700	8370
31	11800	---	e10400	e8450	---	47700	---	23700	---	42900	14400	---
TOTAL	200180	404300	385590	265930	232190	635560	2707800	1099100	460900	1109200	665400	304900
MEAN	6457	13480	12440	8578	8293	20500	90260	35450	15360	35780	21460	10160
MAX	11800	15800	15100	10300	8800	47700	133000	55300	26700	43000	42600	14500
MIN	4110	10500	9130	6670	7470	8260	52200	22700	10100	31000	13900	8210
AC-FT	397100	801900	764800	527500	460500	1261000	5371000	2180000	914200	2200000	1320000	604800
CFSM	.18	.37	.34	.23	.23	.56	2.45	.96	.42	.97	.58	.28
IN.	.20	.41	.39	.27	.23	.64	2.74	1.11	.47	1.12	.67	.31

e Estimated

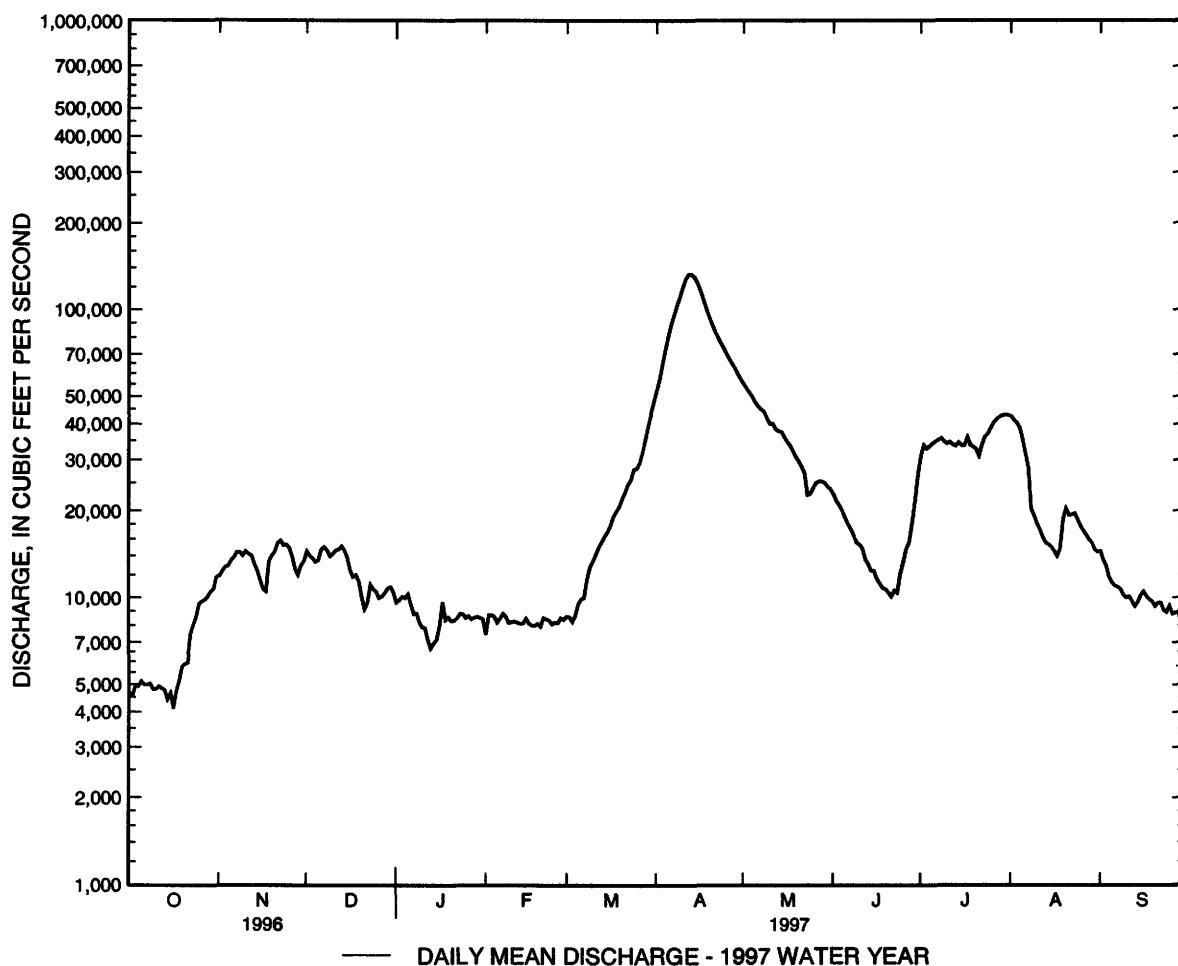
UPPER MISSISSIPPI RIVER BASIN

05331000 MISSISSIPPI RIVER AT ST. PAUL, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1892 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	8567	7806	5613	4559	4488	11110	25920	20820	18080	14350	8917	8092
MAX	38210	27660	16080	11500	14700	43240	91610	66470	57170	73590	42550	34380
(WY)	1987	1972	1983	1983	1966	1983	1969	1986	1993	1993	1993	1986
MIN	1289	1348	1277	1097	1300	1757	3421	3085	1980	1272	864	1143
(WY)	1937	1937	1935	1935	1895	1940	1895	1934	1934	1934	1934	1934

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1892 - 1997
ANNUAL TOTAL	6321610	8471050	
ANNUAL MEAN	17270	23210	11600
HIGHEST ANNUAL MEAN			29580
LOWEST ANNUAL MEAN			1935
HIGHEST DAILY MEAN	50500	Apr 23	171000
LOWEST DAILY MEAN	4110	Oct 16	632
ANNUAL SEVEN-DAY MINIMUM	4440	Sep 22	741
INSTANTANEOUS PEAK FLOW			171000
INSTANTANEOUS PEAK STAGE			26.01
ANNUAL RUNOFF (AC-FT)	12540000	16800000	8400000
ANNUAL RUNOFF (CFSM)	.47	.63	.32
ANNUAL RUNOFF (INCHES)	6.39	8.56	4.28
10 PERCENT EXCEEDS	39200	46800	27400
50 PERCENT EXCEEDS	11300	14000	7100
90 PERCENT EXCEEDS	5410	8140	2700



UPPER MISSISSIPPI RIVER BASIN

05331580 MISSISSIPPI RIVER BELOW LOCK AND DAM 2, AT HASTINGS, MN

LOCATION.--Lat 44°44'48", long 92°51'08", SE $\frac{1}{4}$ SE $\frac{1}{4}$, sec. 21, T.115 N., R.17 W., Dakota County, Hydrologic Unit 07010206, near bridge on U.S. Highway 61 in Hastings, 1.2 mi downstream from Lock and Dam 2, 2.5 mi upstream from St. Croix River, and at mile 813.8 upstream from Ohio River.

DRAINAGE AREA.--37,050 mi².

PERIOD OF RECORD.--October 1996 to current year.

REMARKS.--Water-discharge computed on the basis of routed discharge for Mississippi River at St. Paul (station 05331000) adjusted for inflow and travel time.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5270	12500	14200	11100	9060	9020	49700	59700	24800	28000	44800	15200
2	5160	12600	15300	10300	8030	9260	54400	57500	23900	32600	44500	15400
3	5060	13100	14800	10400	9340	9210	59400	55500	22600	35500	43000	14400
4	5450	13500	14500	10800	9330	8880	67000	53600	21900	34300	42100	13800
5	5400	13600	14100	10800	9210	9330	75400	51800	21000	34800	40300	12600
6	5600	14300	14300	11000	8790	10200	84000	49500	19900	35700	36700	12100
7	5460	14600	15500	10200	9080	10500	92900	48100	18900	36300	33000	11800
8	5470	15200	15800	9410	9420	10700	99900	46900	18200	36800	29500	11600
9	5530	15200	15400	9470	9210	12300	108000	46100	17400	37300	21400	11500
10	5300	14800	14800	8830	8780	13600	115000	43400	16300	36400	20400	11000
11	5290	15300	15000	8500	8850	14300	124000	41700	16100	35800	19100	10800
12	5410	15000	15400	8450	8880	15100	132000	41800	15600	36200	18200	10900
13	5310	14800	15500	7700	8810	15800	138000	39900	14400	35500	17200	10400
14	5250	13900	15900	7220	8740	16400	138000	39500	13900	35200	16400	10000
15	4900	13100	15400	7500	8740	17300	134000	39100	13100	36100	16200	10300
16	5140	12300	14600	7700	9100	17800	128000	37500	13100	35200	15900	11000
17	4640	11700	13200	8590	8740	18700	121000	36100	12300	35300	15300	11300
18	5240	11300	12500	10300	8640	20200	113000	35100	11900	37700	14700	10900
19	5640	14300	12700	8980	8650	20900	105000	33600	11500	35400	15700	10500
20	6250	14800	12100	9150	8750	21800	98700	32200	11400	34800	20000	10300
21	6390	15200	10800	8910	8590	23200	93300	31000	11100	34200	21500	10000
22	6460	16300	9760	8930	9140	24400	88200	29800	10800	32400	20400	10300
23	8070	16600	10200	9090	9050	26000	83900	28200	11300	35700	20500	10300
24	8620	16000	11800	9420	8980	26900	80100	23800	11100	37900	20700	9720
25	9200	16100	11400	9390	8710	29200	76600	24000	12900	38800	19700	9570
26	10200	15700	11200	9110	8840	29400	73300	25100	14000	40600	18700	10100
27	10300	14700	10700	9230	8790	30700	70200	26200	15500	42400	18100	9450
28	10400	13300	10800	9020	9140	33300	67500	26500	16400	43400	17500	9560
29	10800	12700	11100	9150	---	37100	65000	26500	19100	44300	16900	9520
30	11300	13600	11500	9220	---	41300	62100	26200	22700	44700	16400	8860
31	11400	---	11600	9140	---	45400	---	25400	---	44900	15600	---
TOTAL	209910	426100	411860	287010	249390	628200	2797600	1181300	483100	1144200	730400	333180
MEAN	6771	14200	13290	9258	8907	20260	93250	38110	16100	36910	23560	11110
MAX	11400	16600	15900	11100	9420	45400	138000	59700	24800	44900	44800	15400
MIN	4640	11300	9760	7220	8030	8880	49700	23800	10800	28000	14700	8860
AC-FT	416400	845200	816900	569300	494700	1246000	5549000	2343000	958200	2270000	1449000	660900
CFSM	.18	.38	.36	.25	.24	.55	2.51	1.03	.43	.99	.64	.30
IN.	.21	.43	.41	.29	.25	.63	2.81	1.18	.48	1.15	.73	.33

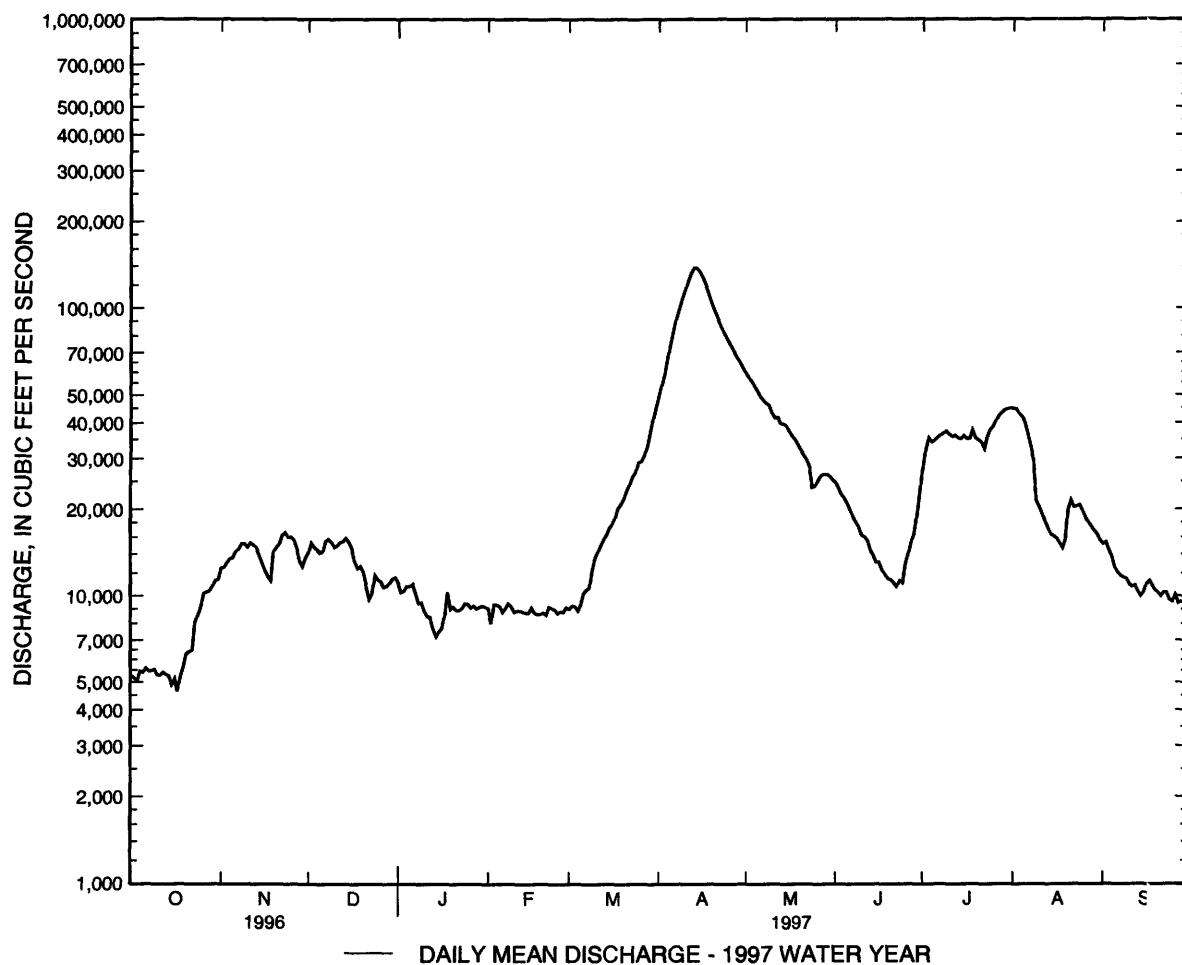
UPPER MISSISSIPPI RIVER BASIN

05331580 MISSISSIPPI RIVER BELOW LOCK AND DAM 2, AT HASTINGS, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	16190	19580	12810	9458	8687	17810	68640	39140	24180	26700	16510	8534
MAX	25600	24960	13290	9657	8907	20260	93250	40160	32250	36910	23560	11110
(WY)	1996	1996	1997	1996	1997	1997	1997	1996	1996	1997	1997	1997
MIN	6771	14200	12340	9258	8476	15360	44020	38110	16100	16490	9453	5962
(WY)	1997	1997	1996	1997	1996	1996	1996	1997	1997	1996	1996	1996

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1996 - 1997
ANNUAL TOTAL	6585480	8882250	
ANNUAL MEAN	17990	24330	22360
HIGHEST ANNUAL MEAN			24330
LOWEST ANNUAL MEAN			20390
HIGHEST DAILY MEAN	51900	Apr 24	138000
LOWEST DAILY MEAN	4620	Sep 29	4620
ANNUAL SEVEN-DAY MINIMUM	4850	Sep 23	5130
ANNUAL RUNOFF (AC-FT)	13060000	17620000	16200000
ANNUAL RUNOFF (CFSM)	.48	.66	.60
ANNUAL RUNOFF (INCHES)	6.60	8.91	8.19
10 PERCENT EXCEEDS	40400	48700	42700
50 PERCENT EXCEEDS	11900	14800	14800
90 PERCENT EXCEEDS	5850	8730	8280



UPPER MISSISSIPPI RIVER BASIN

05331580 MISSISSIPPI RIVER BELOW LOCK AND DAM 2, AT HASTINGS, MN--Continued
(National Water-Quality Assessment Station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1996 to current year.

NASQAN samples previously collected at Mississippi River at Ninninger (station no. 05331570), January 1977 to September 1995.

PERIOD OF DAILY RECORD:

WATER TEMPERATURES.-- May 1996 to current year.

INSTRUMENTATION.--Water-quality monitor since May 1996, provides continuous recordings. Sensor located between Hwy. 61 bridge and railroad bridge at Hastings.

REMARKS.--Records represent water temperature at sensor within 0.5°C. Temperature at the sensor was compared with the average for the river by temperature cross section on Oct. 4, Nov. 18, May 7, June 3. Variation was within 0.9°C.

EXTREMES FOR PERIOD OF DAILY RECORD:

WATER TEMPERATURES.-- Maximum, 28.0 °C, June 29, 30, 1996; minimum observed, 0.5 °C, on many days in 1996..

EXTREMES FOR CURRENT YEAR:

WATER TEMPERATURES.-- Maximum 19.5 °C, June 2; minimum observed, 0.5 °C, on many days during winter.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN
OCTOBER					NOVEMBER				DECEMBER				JANUARY		
1	16.0	15.0	15.5		5.0	4.0	4.5		---	---	---		---	---	---
2	16.0	15.0	15.5		5.0	4.0	4.5		---	---	---		---	---	---
3	15.0	14.0	14.5		4.5	3.5	4.0		---	---	---		---	---	---
4	14.0	12.0	13.5		4.5	4.0	4.5		---	---	---		---	---	---
5	14.0	13.0	13.5		4.5	4.0	4.5		---	---	---		---	---	---
6	15.0	14.0	14.5		5.5	4.5	5.0		---	---	---		---	---	---
7	15.0	14.0	14.5		5.0	4.5	5.0		---	---	---		---	---	---
8	14.0	13.5	14.0		5.0	4.5	5.0		---	---	---		---	---	---
9	14.0	13.0	13.5		4.5	3.5	4.0		---	---	---		---	---	---
10	13.0	12.5	12.5		3.5	3.0	3.0		---	---	---		---	---	---
11	12.5	12.0	12.0		3.0	2.0	2.5		---	---	---		---	---	---
12	13.0	12.0	12.5		2.0	1.5	1.5		---	---	---		---	---	---
13	13.5	13.0	13.0		1.5	1.0	1.5		---	---	---		---	---	---
14	14.0	13.5	13.5		1.5	1.0	1.0		---	---	---		---	---	---
15	14.5	13.5	14.0		1.0	.5	.5		---	---	---		---	---	---
16	14.5	14.0	14.0		2.0	.5	1.0		---	---	---		---	---	---
17	14.5	13.5	14.5		2.0	1.0	1.5		---	---	---		---	---	---
18	13.5	11.0	12.0		---	---	---		---	---	---		---	---	---
19	11.0	10.5	11.0		---	---	---		---	---	---		---	---	---
20	11.5	11.0	11.0		3.0	2.0	2.5		---	---	---		---	---	---
21	11.5	11.0	11.5		2.5	1.5	2.0		---	---	---		---	---	---
22	11.5	10.0	11.0		1.5	1.5	1.5		---	---	---		---	---	---
23	10.0	9.0	9.5		1.5	1.0	1.5		---	---	---		---	---	---
24	9.0	9.0	9.0		1.5	1.0	1.5		---	---	---		---	---	---
25	9.5	8.5	9.0		1.0	.5	1.0		---	---	---		---	---	---
26	10.5	9.5	10.0		.5	.5	.5		---	---	---		---	---	---
27	10.5	10.0	10.5		2.0	.5	1.0		---	---	---		---	---	---
28	10.0	9.0	9.0		2.0	1.0	2.0		---	---	---		---	---	---
29	9.5	9.0	9.0		---	---	---		---	---	---		---	---	---
30	9.5	7.0	8.5		---	---	---		---	---	---		---	---	---
31	7.0	5.0	5.5		---	---	---		---	---	---		---	---	---
MONTH	16.0	5.0	12.0		---	---	---		---	---	---		---	---	---

UPPER MISSISSIPPI RIVER BASIN

05331580 MISSISSIPPI RIVER BELOW LOCK AND DAM 2, AT HASTINGS, MN--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN
JUNE					JULY				AUGUST				SEPTEMBER		
1	18.5	16.5	17.0		---	---	---		---	---	---		---	---	---
2	19.5	17.5	18.5		---	---	---		---	---	---		---	---	---
3	---	---	---		---	---	---		---	---	---		---	---	---
4	---	---	---		---	---	---		---	---	---		---	---	---
5	---	---	---		---	---	---		---	---	---		---	---	---
6	---	---	---		---	---	---		---	---	---		---	---	---
7	---	---	---		---	---	---		---	---	---		---	---	---
8	---	---	---		---	---	---		---	---	---		---	---	---
9	---	---	---		---	---	---		---	---	---		---	---	---
10	---	---	---		---	---	---		---	---	---		---	---	---
11	---	---	---		---	---	---		---	---	---		---	---	---
12	---	---	---		---	---	---		---	---	---		---	---	---
13	---	---	---		---	---	---		---	---	---		---	---	---
14	---	---	---		---	---	---		---	---	---		---	---	---
15	---	---	---		---	---	---		---	---	---		---	---	---
16	---	---	---		---	---	---		---	---	---		---	---	---
17	---	---	---		---	---	---		---	---	---		---	---	---
18	---	---	---		---	---	---		---	---	---		---	---	---
19	---	---	---		---	---	---		---	---	---		---	---	---
20	---	---	---		---	---	---		---	---	---		---	---	---
21	---	---	---		---	---	---		---	---	---		---	---	---
22	---	---	---		---	---	---		---	---	---		---	---	---
23	---	---	---		---	---	---		---	---	---		---	---	---
24	---	---	---		---	---	---		---	---	---		---	---	---
25	---	---	---		---	---	---		---	---	---		---	---	---
26	---	---	---		---	---	---		---	---	---		---	---	---
27	---	---	---		---	---	---		---	---	---		---	---	---
28	---	---	---		---	---	---		---	---	---		---	---	---
29	---	---	---		---	---	---		---	---	---		---	---	---
30	---	---	---		---	---	---		---	---	---		---	---	---
31	---	---	---		---	---	---		---	---	---		---	---	---
MONTH	---	---	---		---	---	---		---	---	---		---	---	---

UPPER MISSISSIPPI RIVER BASIN

05331580 MISSISSIPPI RIVER BELOW LOCK AND DAM 2, AT HASTINGS, MN.--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT										
04...	0930	5450	561	575	8.5	8.0	13.5	756	10.7	103
NOV										
18...	1145	11300	518	534	8.0	7.9	0.5	752	13.4	94
DEC										
05...	1050	14100	632	638	7.9	7.8	0.0	740	13.2	94
JAN										
09...	0935	9470	614	619	7.9	7.7	0.0	738	12.7	89
FEB										
05...	1035	9210	549	--	7.4	--	0.5	755	12.8	13
MAR										
14...	1005	16400	609	611	7.8	7.8	0.5	748	12.7	89
APR										
12...	1038	132000	376	391	7.7	7.6	3.5	746	9.6	73
23...	1145	80100	476	485	7.9	7.9	10.0	744	10.5	95
MAY										
07...	1132	48100	514	514	8.5	8.4	13.5	748	11.3	110
JUN										
03...	1047	22600	610	604	8.3	8.3	18.5	749	9.7	105
26...	1240	14000	624	600	8.1	8.1	24.5	--	7.2	88
JUL										
03...	1127	35500	517	500	8.0	8.0	21.0	745	5.8	67
AUG										
12...	1225	18200	594	586	8.1	8.1	23.0	748	7.2	86
SEP										
02...	1040	15400	575	556	8.2	8.3	24.0	750	7.9	95

DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)
OCT										
04...	220	182	192	222	<0.020	0.040	0.50	1.0	1.20	0.280
NOV										
18...	200	134	153	163	0.290	0.060	0.90	1.3	1.50	0.220
DEC										
05...	300	206	218	251	0.280	0.040	0.80	1.0	3.60	0.150
JAN										
09...	260	213	216	260	0.390	0.060	1.0	1.0	2.40	0.160
FEB										
05...	250	279	--	340	0.500	0.100	1.2	1.1	1.70	0.150
MAR										
14...	270	207	218	253	0.370	0.100	1.0	1.0	3.00	0.080
APR										
12...	170	114	124	139	0.330	0.050	0.90	1.5	2.60	0.300
23...	210	148	149	181	0.094	0.034	0.82	1.1	1.96	0.195
MAY										
07...	250	156	166	190	<0.015	0.019	0.65	1.6	0.897	0.160
JUN										
03...	290	210	211	245	<0.015	0.025	0.47	0.91	3.90	0.098
26...	290	205	204	250	0.169	0.053	0.58	1.1	1.67	0.195
JUL										
03...	220	194	167	237	0.074	0.095	0.70	1.5	4.98	0.342
AUG										
12...	280	179	214	218	0.022	0.041	0.89	1.1	1.89	0.226
SEP										
02...	260	206	210	248	0.020	0.029	0.63	1.4	1.50	0.222

UPPER MISSISSIPPI RIVER BASIN

05331580 MISSISSIPPI RIVER BELOW LOCK AND DAM 2, AT HASTINGS, MN.--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
OCT 04...	0.160	0.140	6.8	2.5	52	23	27	0.8	3.8	36
NOV 18...	0.160	0.150	8.1	0.60	49	20	26	0.8	3.2	35
DEC 05...	0.110	0.120	8.3	0.70	72	28	19	0.5	3.4	26
JAN 09...	0.150	0.150	6.9	0.40	64	24	25	0.7	2.8	33
FEB 05...	0.140	0.140	7.3	0.30	63	22	24	0.7	3.4	31
MAR 14...	0.090	0.120	7.0	0.50	68	24	20	0.5	3.7	28
APR 12...	0.120	0.120	7.2	2.2	44	15	7.0	0.2	4.1	11
23...	0.077	0.068	7.9	2.5	51	20	8.8	0.3	4.1	11
MAY 07...	<0.010	<0.010	8.3	2.3	58	25	13	0.3	4.1	14
JUN 03...	<0.010	0.015	7.1	1.1	69	28	15	0.4	3.1	19
26...	0.093	0.088	6.7	1.7	69	28	20	0.5	3.7	27
JUL 03...	0.129	0.111	7.9	2.8	56	21	14	0.4	3.0	20
AUG 12...	0.152	0.137	9.2	1.2	69	26	14	0.4	3.7	20
SEP 02...	0.108	0.093	7.6	3.0	64	25	15	0.4	3.5	22

UPPER MISSISSIPPI RIVER BASIN

05331580 MISSISSIPPI RIVER BELOW LOCK AND DAM 2, AT HASTINGS, MN.--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	SULFATE DIS- SOLVED (MG/L AS SO ₄) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO ₂) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT									
04...	54	0.30	8.8	<3.0	2.0	342	320	--	--
NOV									
18...	63	0.20	9.3	39	39	327	293	19	96
DEC									
05...	70	0.30	15	43	36	392	374	92	74
JAN									
09...	53	0.30	15	34	55	375	357	4	97
FEB									
05...	41	0.20	15	50	70	339	375	5	100
MAR									
14...	57	0.30	15	18	67	376	355	15	94
APR									
12...	50	0.21	12	65	51	254	224	157	88
23...	75	0.19	13	33	22	303	281	106	81
MAY									
07...	87	0.25	7.2	27	6.0	342	304	67	98
JUN									
03...	76	0.29	8.4	6.1	17	393	356	40	98
26...	72	0.30	10	3.4	2.5	382	360	39	100
JUL									
03...	46	0.29	15	3.4	2.3	328	313	178	100
AUG									
12...	63	0.28	19	8.3	16	408	332	54	100
SEP									
02...	53	0.27	16	4.7	1.3	348	330	54	98

ST. CROIX RIVER BASIN

05336700 KETTLE RIVER BELOW SANDSTONE, MN

LOCATION.--Lat 46°06'20", long 92°51'50", in NW¼SW¼, sec. 22, T.42 N., R.20 W., Pine County, Hydrologic Unit 07030003, on Sandstone Federal Correctional Institution property, on left bank, about 1.8 mi south of Sandstone.

DRAINAGE AREA.--863 mi².

PERIOD OF RECORD.--October 1967 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 931.50 ft above mean sea level. (Minnesota Department of Transportation bench mark).

REMARKS.--Records good except those for estimated daily discharge, which are poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in April 1965 reached a stage of 12.96 ft, from flood marks, discharge, 13,400 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,600 ft³/s and maximum (*)

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)					
Apr. 06	2300	*10,900	*12.02	(No other peak greater than base discharge.)								
DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997												
DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	250	e690	e1100	e410	e310	e290	1460	1250	384	941	531	386
2	239	e670	e1000	e400	e300	e290	2760	1140	359	1010	449	308
3	227	e650	e900	e400	e300	e290	4060	1040	334	971	393	283
4	214	e630	e820	e390	e300	e290	6090	946	317	994	373	261
5	207	e620	e760	e390	e300	e290	8530	859	302	1160	375	248
6	203	e610	e710	e390	e300	e290	10300	787	300	1020	386	233
7	190	e600	e660	e380	e300	e290	10200	722	291	942	363	221
8	182	e600	e620	e380	e300	e290	8830	721	280	916	330	213
9	179	e590	e590	e380	e300	e290	7410	712	260	966	301	201
10	175	e580	552	e370	e300	e290	5910	665	241	855	268	194
11	166	e540	534	e370	e300	e290	4720	653	233	717	242	188
12	163	e495	524	e360	e300	e290	3970	614	225	610	226	181
13	161	e440	504	e360	e300	e290	3510	571	209	885	207	175
14	157	e415	488	e350	e300	e290	3350	549	194	1860	200	171
15	155	e520	481	e350	e300	e295	3430	556	200	2200	213	171
16	155	e740	499	e350	e300	e295	3570	566	204	1790	251	201
17	222	e1100	e520	e350	e300	e295	3450	552	202	1560	262	200
18	324	e1500	e525	e340	e295	e295	3230	534	207	1240	259	227
19	394	e1900	e525	e340	e295	e295	3160	553	205	1020	250	222
20	400	e2300	e520	e340	e295	e290	3060	608	199	862	279	220
21	397	e2600	e510	e330	e295	288	2910	609	189	741	363	220
22	379	e2550	e500	e330	e295	297	2690	573	177	645	401	218
23	403	e2500	e490	e330	e295	297	2450	543	168	576	406	207
24	514	e2300	e480	e320	e295	304	2200	541	178	509	383	198
25	580	e2100	e470	e320	e295	327	1990	571	434	607	364	190
26	603	e1800	e460	e320	e295	320	1790	573	627	1270	341	183
27	680	e1550	e450	e310	e295	e370	1620	521	537	1230	318	176
28	668	e1350	e440	e310	e295	e420	1560	483	514	1050	283	180
29	671	e1250	e430	e309	---	e540	1470	460	577	913	281	178
30	786	e1200	e420	e310	---	e700	1350	430	666	776	306	175
31	e720	---	e410	e310	---	e1000	---	409	---	636	285	---
TOTAL	10764	35390	17892	10899	8355	10688	121030	20311	9213	31472	9889	6429
MEAN	347	1180	577	352	298	345	4034	655	307	1015	319	214
MAX	786	2600	1100	410	310	1000	10300	1250	666	2200	531	386
MIN	155	415	410	309	295	288	1350	409	168	509	200	171
AC-FT	21350	70200	35490	21620	16570	21200	240100	40290	18270	62420	19610	12750
CFM	.40	1.37	.67	.41	.35	.40	4.67	.76	.36	1.18	.37	.25
IN.	.46	1.53	.77	.47	.36	.46	5.22	.88	.40	1.36	.43	.28

e Estimated

ST. CROIX RIVER BASIN

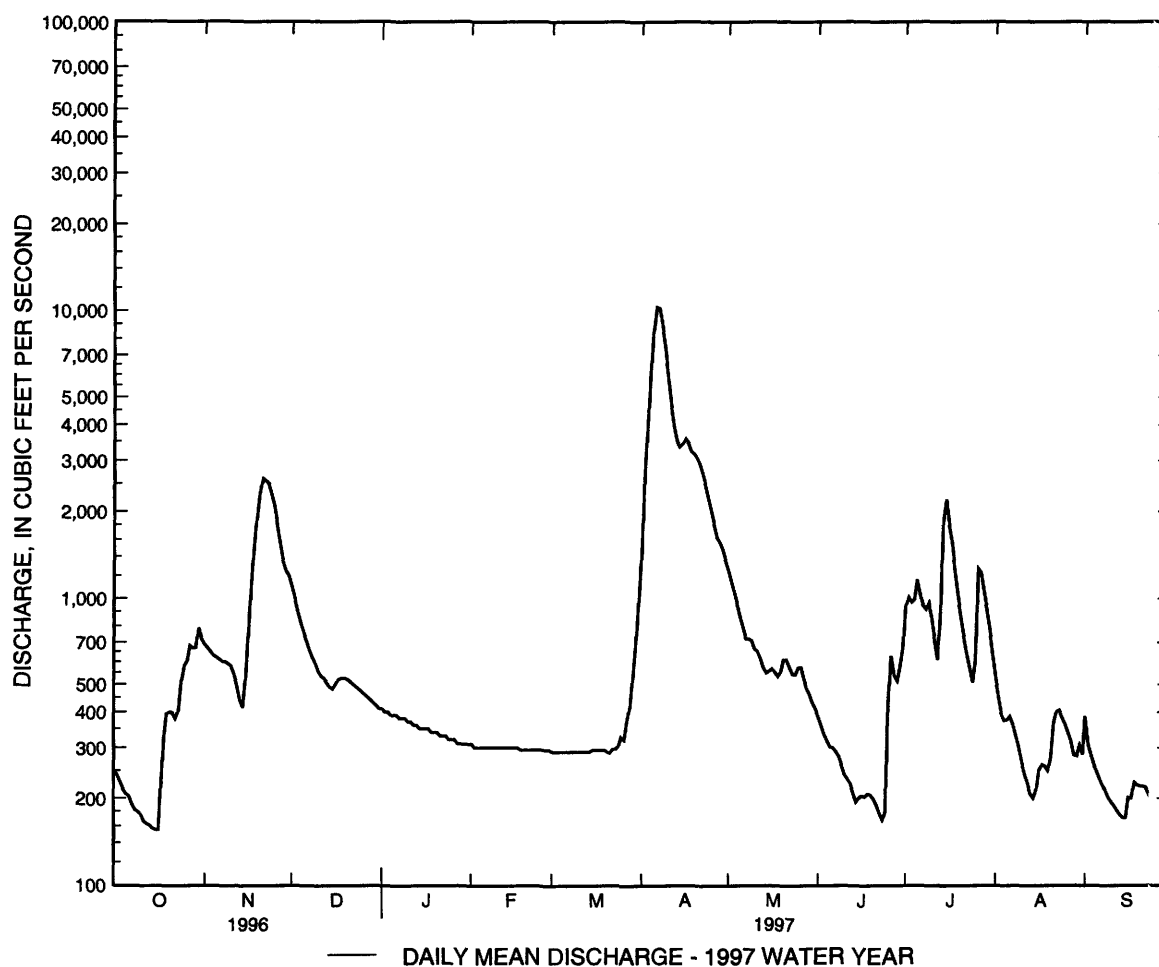
05336700 KETTLE RIVER BELOW SANDSTONE, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	759	611	287	186	178	531	2402	1263	880	685	396	560
MAX	2652	2414	652	411	417	1742	4653	3168	2799	2869	2094	3065
(WY)	1969	1972	1984	1984	1984	1973	1969	1986	1993	1972	1972	1986
MIN	80.6	85.8	98.3	77.3	98.5	141	435	222	131	110	86.4	71.3
(WY)	1977	1977	1977	1971	1977	1980	1977	1980	1988	1988	1976	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1968 - 1977	
ANNUAL TOTAL	314350		292332		728	
ANNUAL MEAN	859		801		1390	
HIGHEST ANNUAL MEAN					254	
LOWEST ANNUAL MEAN					1972	
HIGHEST DAILY MEAN	9160	Apr 20	10300	Apr 6	16400	Jul 23 1972
LOWEST DAILY MEAN	151	Sep 20	155	Oct 15,16	43	Nov 12 1976
ANNUAL SEVEN-DAY MINIMUM	161	Sep 15	162	Oct 10	62	Jan 14 1971
INSTANTANEOUS PEAK FLOW			10900	Apr 6	17200	Jul 23 1972
INSTANTANEOUS PEAK STAGE			12.02	Apr 6	15.38	Jul 23 1972
INSTANTANEOUS LOW FLOW			155	Oct 14	25a	Nov 11 1977
ANNUAL RUNOFF (AC-FT)	623500		579800		527500	
ANNUAL RUNOFF (CFSM)	1.00		.93		.84	
ANNUAL RUNOFF (INCHES)	13.55		12.60		11.46	
10 PERCENT EXCEEDS	1720		1690		1780	
50 PERCENT EXCEEDS	481		393		297	
90 PERCENT EXCEEDS	200		204		130	

a Result of freezeup.



ST. CROIX RIVER BASIN
05336700 KETTLE RIVER BELOW SANDSTONE, MN--Continued
(National Water Quality Assessment Station),

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED SATUR- ATION) (00301)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
APR 03...	1530	4060	72	6.9	2.0	738	12.4	91	0.280

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR 03...	<0.010	0.90	1.0	0.260	0.130	0.050	0.040	39	66

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ST. CROIX RIVER BASIN

05337400 KNIFE RIVER NEAR MORA, MN

LOCATION.--Lat 45°55'12", long 93°18'26", in SW¹/₄SW¹/₄ sec. 26, T.40 N., R.24 W., Kanabec County, Hydrologic Unit 07030004, on left bank 400 ft upstream from bridge on County Highway 77, 1.1 mi upstream from mouth and 2.5 mi north of Mora.

DRAINAGE AREA.--102 mi².

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1969-74; July 1974 to current year.

GAGE.--Water-stage recorder. Datum of gage is 991.20 ft above mean sea level (Kanabec County bench mark).

REMARKS.--Records good except those for periods of estimated daily discharges, which are poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 26, 1972, reached a stage of 14.0 ft, from information by local resident (discharge not determined).

Result of dam failure and backwater from collapsed bridge.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr. 06	1200	*1870	*6.48				

(No other peak greater than base discharge.)

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.7	34	e36	e19	e13	e14	274	69	15	13	19	6.9
2	8.4	33	e34	e19	e13	e14	670	67	14	13	17	11
3	5.0	30	e33	e19	e13	e14	914	64	14	13	15	7.3
4	4.0	29	e32	e27	e13	e15	1250	50	12	15	17	5.5
5	3.7	28	e30	e40	e13	e15	1670	51	13	14	13	4.3
6	3.9	28	e29	e28	e13	e15	1790	45	13	16	12	4.4
7	5.4	32	e28	e23	e13	e15	1360	44	11	15	11	4.9
8	4.4	e31	e28	e20	e13	e15	945	52	10	19	8.6	4.3
9	4.8	e30	e27	e18	e13	e15	672	57	9.1	16	7.4	5.7
10	5.6	e29	e27	e17	e13	e16	482	48	8.4	15	7.8	5.1
11	4.4	e28	e26	e17	e13	e16	368	51	8.1	14	6.2	4.3
12	4.2	e26	e26	e17	e13	e16	300	48	8.4	14	5.2	3.5
13	5.0	e24	e25	e16	e13	e16	256	38	10	22	5.0	3.3
14	5.6	e23	e25	e16	e13	e16	234	42	8.2	32	4.6	3.3
15	5.5	e41	e24	e16	e13	e16	229	40	7.9	40	6.3	4.1
16	5.3	e68	e24	e16	e13	e16	218	35	11	43	6.5	7.6
17	24	e100	e23	e16	e12	e17	207	35	9.1	41	7.2	10
18	24	e160	e23	e15	e12	e17	197	36	11	38	4.9	10
19	23	e253	e23	e15	e12	17	185	35	8.5	32	6.1	15
20	23	e200	e22	e15	e12	17	171	31	8.3	27	10	12
21	21	e125	e22	e15	e12	19	162	28	7.8	26	9.4	7.6
22	21	e92	e22	e14	e12	20	149	26	7.0	23	8.4	6.9
23	31	e75	e22	e14	e12	22	137	26	6.3	20	6.9	8.0
24	27	e65	e21	e14	e12	26	126	30	7.6	18	8.6	7.3
25	27	e57	e21	e14	e12	32	114	32	15	41	7.6	8.1
26	27	e51	e21	e14	e12	32	105	25	12	46	7.5	9.1
27	25	e46	e21	e14	e12	37	102	20	9.6	45	7.2	8.5
28	24	e43	e20	e14	e12	47	91	19	11	40	6.7	9.8
29	29	e40	e20	e13	---	65	85	21	15	31	5.9	9.2
30	39	e38	e20	e13	---	94	85	19	14	24	7.0	10
31	33	---	e20	e13	---	141	---	17	---	20	7.8	---
TOTAL	479.9	1859	775	541	352	847	13548	1201	315.3	786	272.8	217.0
MEAN	15.5	62.0	25.0	17.5	12.6	27.3	452	38.7	10.5	25.4	8.80	7.23
MAX	39	253	36	40	13	141	1790	69	15	46	19	15
MIN	3.7	23	20	13	12	14	85	17	6.3	13	4.6	3.3
AC-FT	952	3690	1540	1070	698	1680	26870	2380	625	1560	541	430
CFSM	.15	.61	.25	.17	.12	.27	4.43	.38	.10	.25	.09	.07
IN.	.18	.68	.28	.20	.13	.31	4.94	.44	.11	.29	.10	.08

e Estimated

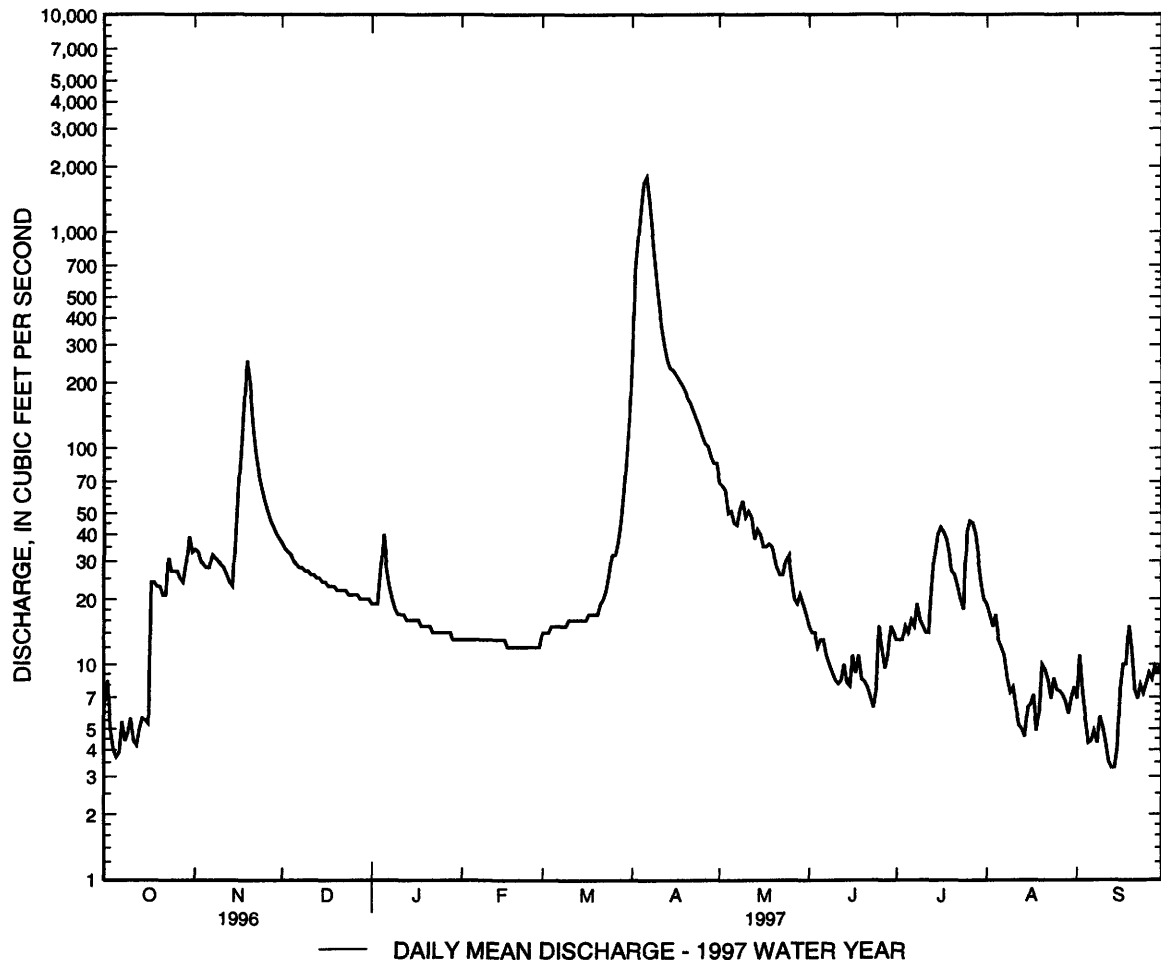
ST. CROIX RIVER BASIN

05337400 KNIFE RIVER NEAR MORA, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	51.5	42.8	25.6	13.6	13.8	70.1	238	105	59.5	53.6	30.7	37.1
MAX	242	206	109	28.8	48.9	238	472	338	233	171	218	257
(WY)	1985	1978	1978	1984	1984	1983	1986	1986	1984	1975	1995	1986
MIN	1.84	1.38	1.17	1.14	1.16	14.3	30.5	12.5	3.06	.98	1.86	2.15
(WY)	1977	1990	1990	1977	1990	1975	1977	1980	1988	1988	1976	1987

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1974 - 1997
ANNUAL TOTAL	24787.7	21194.0	
ANNUAL MEAN	67.7	58.1	62.0
HIGHEST ANNUAL MEAN			135
LOWEST ANNUAL MEAN			16.8
HIGHEST DAILY MEAN	1080	Apr 19	1790
LOWEST DAILY MEAN	2.0	Aug 29	3.3
ANNUAL SEVEN-DAY MINIMUM	2.2	Aug 26	4.2
INSTANTANEOUS PEAK FLOW		1870	Apr 6
INSTANTANEOUS PEAK STAGE		6.48	Apr 6
INSTANTANEOUS LOW FLOW		3.2	Sep 12
ANNUAL RUNOFF (AC-FT)	49170	42040	44900
ANNUAL RUNOFF (CFSM)	.66	.57	.61
ANNUAL RUNOFF (INCHES)	9.04	7.73	8.25
10 PERCENT EXCEEDS	146	87	147
50 PERCENT EXCEEDS	24	17	21
90 PERCENT EXCEEDS	4.0	6.6	4.9



ST. CROIX RIVER BASIN

05338500 SNAKE RIVER NEAR PINE CITY, MN

LOCATION.--Lat 45°50'30", long 92°56'00", in SE1/4NW1/4 sec. 26, T. 39 N., R. 21 W., Pine County, Hydrologic Unit 07030004, on left bank at site of former power plant and dam, 0.5 mi downstream from Cross Lake and 1.5 mi northeast of Pine City.

DRAINAGE AREA.--958 mi².

PERIOD OF RECORD.--June 1913 to September 1917, July 1951 to Sept. 1981, Oct. 1992 to current year.

GAGE.--Water-stage recorder. Datum of gage is 919.00 ft above mean sea level. June 25, 1913 to Sept. 30, 1917, nonrecording gage at site 500 ft downstream at different datum. July 1 to Oct. 28, 1951, nonrecording gage at present site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	99	382	696	e280	e208	e196	1760	954	284	171	623	166
2	111	395	e620	e278	e207	e196	3080	876	269	251	528	199
3	88	392	e570	e274	e206	e195	4250	828	263	223	445	179
4	81	386	e520	e271	e206	e195	5440	742	264	205	382	175
5	82	375	e480	e269	e205	e194	6570	700	253	204	343	180
6	93	378	e440	e266	e205	e194	7700	601	233	206	302	176
7	83	361	e410	e263	e204	e193	8730	555	219	204	264	150
8	83	358	e385	e261	e204	e194	9530	608	209	228	233	150
9	90	365	e365	e259	e203	e196	10100	571	204	235	210	150
10	81	356	e349	e257	e203	e197	9930	562	189	237	198	130
11	78	334	e343	e253	e202	e198	9100	606	177	245	181	122
12	81	297	e340	e251	e202	e199	7960	566	160	247	169	110
13	83	270	e337	e249	e201	e200	6750	543	138	401	155	106
14	71	250	e332	e247	e201	e201	5620	534	128	449	145	108
15	93	302	e330	e243	e200	e202	4690	501	133	468	160	108
16	92	370	e327	e241	e200	e203	3940	465	130	502	168	121
17	159	609	e323	e239	e200	e205	3370	443	117	517	150	146
18	176	838	e320	e237	e200	e206	2950	431	121	472	146	129
19	128	1110	e317	e235	e200	e208	2630	443	115	450	149	135
20	158	1360	e313	e232	e200	217	2400	407	126	452	182	136
21	205	1550	e310	e230	e200	224	2210	386	122	390	180	169
22	214	1590	e307	e228	e199	234	2040	364	110	353	174	190
23	266	1540	e305	e226	e199	249	1890	361	110	341	168	188
24	263	1430	e302	e223	e199	266	1750	354	114	308	168	195
25	254	1280	e300	e221	e198	289	1620	318	136	587	165	169
26	268	1100	e297	e219	e198	296	1480	322	117	724	164	152
27	329	950	e294	e216	e197	326	1350	322	110	915	153	141
28	301	843	e290	e214	e197	388	1240	313	127	1080	135	167
29	321	779	e288	e212	---	509	1160	320	166	1050	123	152
30	439	760	e285	e210	---	779	1020	315	172	910	161	114
31	390	---	e282	e209	---	1130	---	303	---	747	160	---
TOTAL	5260	21310	11377	7513	5644	8679	132260	15614	5016	13772	6884	4513
MEAN	170	710	367	242	202	280	4409	504	167	444	222	150
MAX	439	1590	696	280	208	1130	10100	954	284	1080	623	199
MIN	71	250	282	209	197	193	1020	303	110	171	123	106
AC-FT	10430	42270	22570	14900	11190	17210	262300	30970	9950	27320	13650	8950
CFSM	.18	.74	.38	.25	.21	.29	4.60	.53	.17	.46	.23	.16
IN.	.20	.83	.44	.29	.22	.34	5.14	.61	.19	.53	.27	.18

e Estimated

ST. CROIX RIVER BASIN

05338500 SNAKE RIVER NEAR PINE CITY, MN--Continued

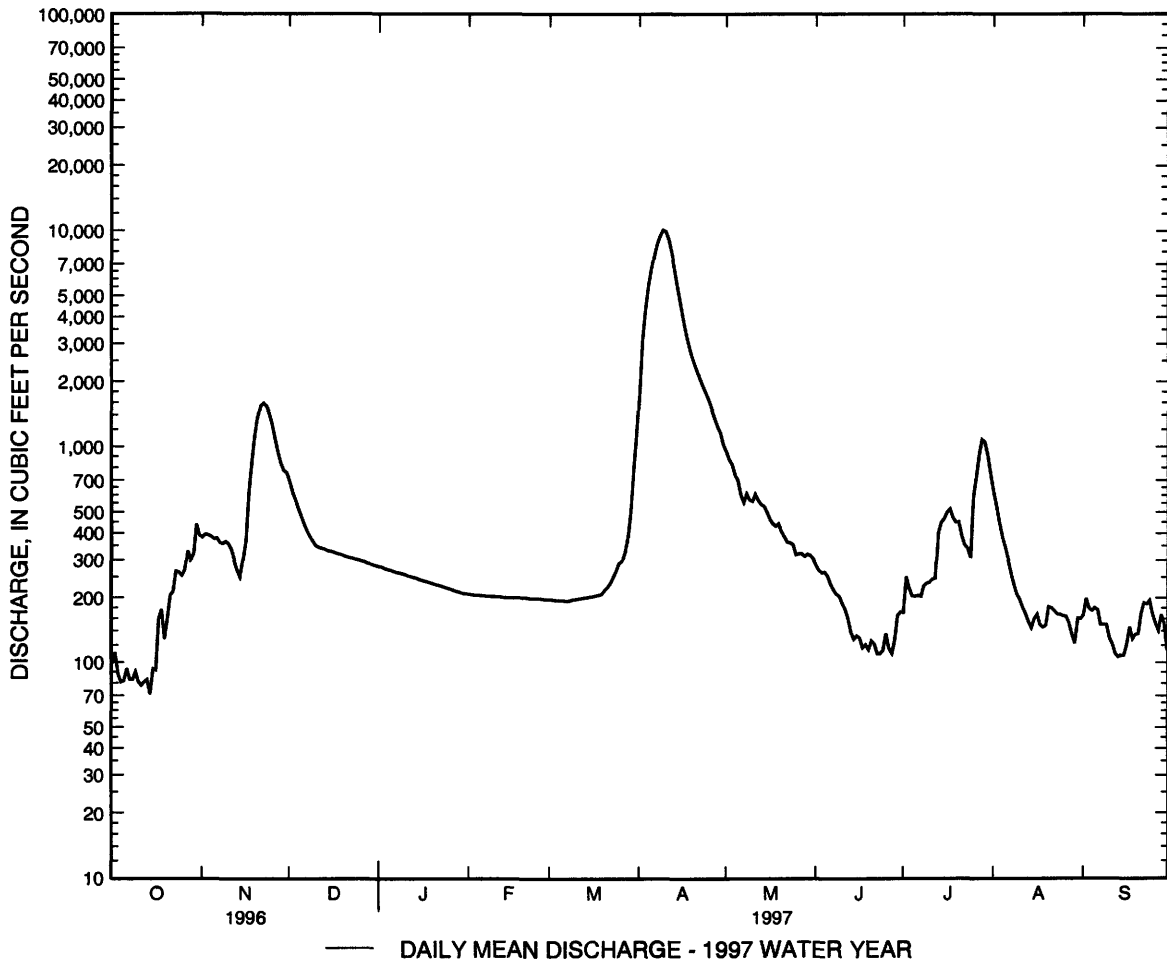
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	417	418	216	132	129	473	2091	1158	818	720	333	313
MAX	3130	2310	837	343	549	2658	4975	2726	2775	3400	2018	1201
(WY)	1969	1972	1978	1966	1966	1966	1965	1979	1967	1952	1972	1951
MIN	47.1	59.9	36.1	29.3	33.4	61.5	172	206	167	100	34.9	37.8
(WY)	1977	1977	1977	1977	1977	1965	1959	1977	1997	1961	1976	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1913 - 1997	
ANNUAL TOTAL	253597		237842			
ANNUAL MEAN	693		652		597 ^a	
HIGHEST ANNUAL MEAN					1223	
LOWEST ANNUAL MEAN					177	
HIGHEST DAILY MEAN	7040		10100		14200	
LOWEST DAILY MEAN	60		71		26	
ANNUAL SEVEN-DAY MINIMUM	61		81		28	
INSTANTANEOUS PEAK FLOW			10200		14300	
INSTANTANEOUS PEAK STAGE			8.89		10.38	
INSTANTANEOUS LOW FLOW			56		5.5 ^b	
ANNUAL RUNOFF (AC-FT)	503000		471800		432500	
ANNUAL RUNOFF (CFSM)	.72		.68		.62	
ANNUAL RUNOFF (INCHES)	9.85		9.24		8.47	
10 PERCENT EXCEEDS	1550		1120		1470	
50 PERCENT EXCEEDS	278		250		224	
90 PERCENT EXCEEDS	84		128		76	

a Median of annual mean discharges is 546 ft³/s.

b Result of dam rehabilitation.



ST. CROIX RIVER BASIN

05338500 SNAKE RIVER NEAR PINE CITY, MN--Continued

(National Water Quality Assessment Station),

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD TEMPER- (STAND- ATURE ARD WATER UNITS) (DEG C) (00400) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED OXYGEN, (PER- DIS- CENT (MG/L) SATUR- (00300) ATION) (00301)	OXYGEN, DIS- SOLVED WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS HCO3 (00453)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00452)	CAF- BONA TE WATER DIS IT FIELD MG/L AS CO3 (00452)
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APR 03...	1130	4230	122	6.8	1.0	738	10.3	72	53	65	0
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DATE	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
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APR 03...	0.220	0.010	0.80	1.0	0.430	0.120	0.080	0.030	14	93
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ST. CROIX RIVER BASIN

05340500 ST. CROIX RIVER AT ST. CROIX FALLS, WI

LOCATION.--Lat 45°24'25", long 92°38'49", in SW 1/4 NW 1/4 sec. 30, T.34 N., R.18 W., Polk County, Hydrologic Unit 07030005, St. Croix National Scenic Riverway, on left bank, 1,500 ft downstream from power plant of Northern States Power Co., in St. Croix Falls, and at mile 52.2.

DRAINAGE AREA.--6,240 mi².

PERIOD OF RECORD.--January 1902 to current year. Prior to January 1910, monthly discharge only, published in WSP 1308. Prior to October 1939, published as "near St. Croix Falls."

REVISED RECORDS.--WSP 1115: 1929. WDR WI-82-1: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 689.94 ft above mean sea level. Prior to July 1905, gage heights and discharge measurements were used by Loweth and Wolff, consulting engineers of St. Paul, Minn., to determine the flow. July 1905 to February 1940, records were computed from power generation at the St. Croix Falls power plant. February 1940 to Sept. 30, 1979, water-stage recorder at site 300 ft downstream at same datum.

REMARKS.--Estimated daily discharges: Ice-affected periods, Dec. 18 to Jan. 19, and Jan. 23 to Mar. 27. Records good except those for ice-affected periods, which are fair. Diurnal fluctuation caused by St. Croix Falls power plant 1,500 ft upstream. Gage-height telemeter and data-collection platform at station.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3130	7170	7310	e3500	e3700	e3200	13300	5660	3370	3190	4470	2890
2	3170	7050	7230	e3600	e3500	e3300	20600	6590	3160	3940	4130	3180
3	2970	6450	6020	e3800	e3500	e3300	23100	5860	3220	3820	3780	4800
4	3040	6590	5770	e3900	e3500	e3200	26500	5680	3250	3800	3490	4650
5	2890	5960	5510	e3800	e3400	e3300	30800	5420	3220	3530	3210	4480
6	2360	5620	5720	e3600	e3500	e3300	35800	5060	3160	4110	3160	3830
7	2810	5610	5980	e3600	e3600	e3300	40000	4840	2960	3850	2950	3540
8	2400	5620	5170	e3500	e3600	e3300	41200	4940	2800	4000	2810	3250
9	2340	5560	5220	e3300	e3400	e3300	40000	4990	2900	4420	2940	3260
10	2660	5490	5160	e3700	e3800	e3300	36900	5130	2560	3960	2350	3160
11	2720	5490	5000	e4000	e3400	e3100	33200	4920	2790	4050	2560	3160
12	2490	4570	5410	e3800	e3200	e3300	29600	4890	2530	3850	2290	3000
13	2530	3330	5470	e3700	e3000	e3300	26300	4790	2330	3930	2320	2760
14	2330	2940	5250	e3800	e3400	e3300	23100	4580	2130	5140	2300	2820
15	2400	3400	4210	e3800	e3300	e3400	20300	4460	2190	6100	2260	2830
16	2640	3830	4280	e3700	e3300	e3400	18400	4310	2420	6430	2320	3090
17	3240	8840	3640	e3600	e3300	e3400	17000	4440	2100	6340	3000	3090
18	3660	9380	e3200	e3600	e3000	e3500	16200	4470	2450	5810	3020	3130
19	4000	11700	e3300	e3600	e3100	e3500	15100	4210	2390	5260	3080	3120
20	3770	13600	e3300	3670	e3100	e3700	14100	4410	2500	5080	3560	3180
21	3910	13800	e3400	3670	e3200	e3600	13800	4330	2320	4360	3540	3290
22	4070	13500	e3500	3400	e3300	e3800	11700	4340	2250	4020	3330	3360
23	4440	11300	e3600	e3600	e3400	e4100	11200	4150	2060	3870	3580	3370
24	5030	10400	e3700	e3800	e3400	e4200	10500	4060	2450	3940	3590	3260
25	5610	8980	e3500	e3800	e3300	e4400	9650	3830	2170	4220	3460	3100
26	5920	7260	e3300	e3700	e3200	e4800	9040	3860	2990	5930	3140	2990
27	5800	6480	e3700	e3600	e3300	e5000	8320	3800	3090	6360	3030	3030
28	5720	6070	e3500	e3700	e3200	6500	7860	3710	3260	6490	3040	3200
29	6060	6540	e3400	e3600	---	7720	7500	3520	3250	5810	2940	3090
30	6310	6920	e3400	e3500	---	10400	6810	3550	3350	5380	2990	2900
31	6870	---	e3500	e3500	---	11400	---	3590	---	5150	2950	---
TOTAL	117290	219450	140650	113440	93900	132620	617880	142390	81620	146140	95590	98810
MEAN	3784	7315	4537	3659	3354	4278	20600	4593	2721	4714	3084	3294
MAX	6870	13800	7310	4000	3800	11400	41200	6590	3370	6490	4470	4800
MIN	2330	2940	3200	3300	3000	3100	6810	3520	2060	3190	2260	2760
CFSM	.61	1.17	.73	.59	.54	.69	3.30	.74	.44	.76	.49	.53
IN.	.70	1.31	.84	.68	.56	.79	3.68	.85	.49	.87	.57	.59

e Estimated

ST. CROIX RIVER BASIN

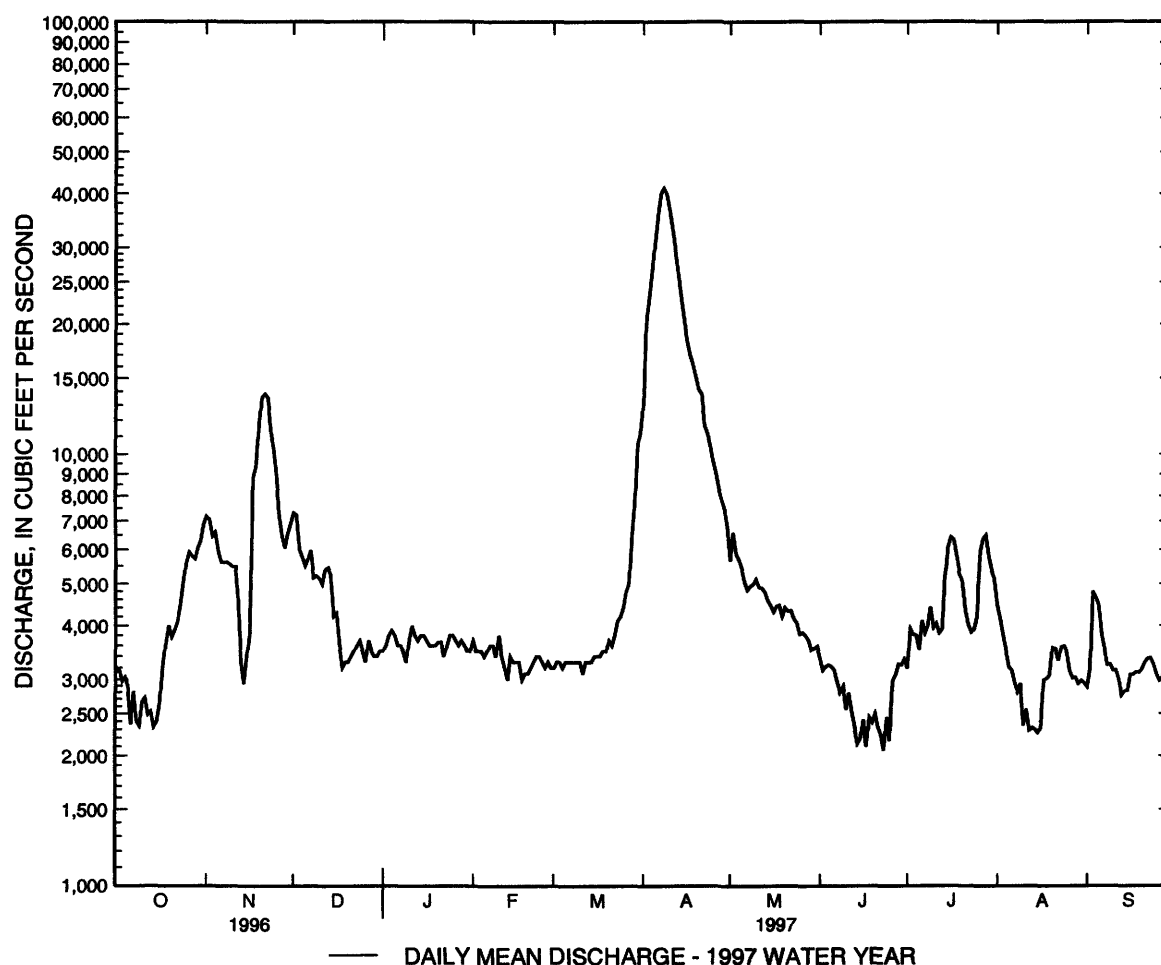
05340500 ST. CROIX RIVER AT ST. CROIX FALLS, WI--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1902 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	3712	3488	2549	2155	2114	4237	10340	7459	5671	4143	2863	3399
MAX	14270	11910	5821	4279	6021	14420	22320	21840	19510	17260	9777	14590
(WY)	1969	1972	1984	1984	1984	1945	1952	1950	1944	1952	1955	1941
MIN	1380	1342	1288	1157	1257	1538	2212	2430	1481	1014	839	1152
(WY)	1933	1911	1911	1911	1913	1912	1902	1934	1934	1934	1934	1933

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1902 - 1997	
ANNUAL TOTAL	2262860		1999780			
ANNUAL MEAN	6183		5479		4354	
HIGHEST ANNUAL MEAN					8569	
LOWEST ANNUAL MEAN					1754	
HIGHEST DAILY MEAN	35600		41200	Apr 8	53900	May 8 1950
LOWEST DAILY MEAN	1970		2060	Jun 23	75	Jul 17 1910
ANNUAL SEVEN-DAY MINIMUM	2290		2290	Jun 13	754	Jul 29 1934
INSTANTANEOUS PEAK FLOW			41500	Apr 8	54900	May 8 1950
INSTANTANEOUS PEAK STAGE			19.14 ^a	Apr 8	25.19	May 8 1950
ANNUAL RUNOFF (CFSM)	.99		.88		.70	
ANNUAL RUNOFF (INCHES)	13.49		11.92		9.48	
10 PERCENT EXCEEDS	11700		8900		9100	
50 PERCENT EXCEEDS	4210		3640		2780	
90 PERCENT EXCEEDS	2940		2810		1560	

a Inside gage reading; outside gage read 19.50 ft.



UPPER MISSISSIPPI RIVER BASIN

05344500 MISSISSIPPI RIVER AT PRESCOTT, WI

LOCATION.--Lat 44°44'45", long 92°48'00", in sec. 9, T.26 N., R.20 W., Pierce County, Hydrologic Unit 07040001, on left bank at Prescott, 200 ft downstream from St. Croix River, 300 ft south of Chicago, Burlington & Quincy Railroad bridge, 800 ft south of bridge on U.S. Highway 10, and at mile 811.4 upstream from Ohio River.

DRAINAGE AREA.--44,800 mi², approximately.

PERIOD OF RECORD.--June 1928 to current year.

REVISED RECORDS.--WSP 1508: 1941. WRD MN-74: 1973.

GAGE.--Water-stage recorder. Datum of gage is 649.50 ft above sea level. Prior to Aug. 2, 1932, nonrecording gage at railroad bridge 300 ft upstream at following datums: June 3, 1928 to Sept. 30, 1929, 19.27 ft higher; Oct. 1, 1929 to Sept. 30, 1930, 17.68 ft higher; Oct. 1, 1930 to Aug. 1, 1932, 19.28 ft higher. Aug. 2, 1932 to Oct. 30, 1938, water-stage recorder at present site at datum 19.28 ft higher; Nov. 1, 1938 to Sept. 7, 1971, water-stage recorder at present site at datum 50.00 ft lower.

REMARKS.--Records good except those for estimated daily discharge, which are fair to poor. Some regulation by reservoirs, navigation dams, and power plants at low and medium stages. Discharges below a stage of 26.7 ft. are computed by routing flows from the Mississippi River at St. Paul (05331C00) and St. Croix River at St. Croix Falls, WI (05340500).

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e8790	e20400	e22300	e15300	e13100	e12700	59300	61400	27500	24900	45000	e20000
2	e8760	e20700	e23700	e14500	e12300	e13100	66200	59300	26900	31000	44200	e19400
3	e8620	e21000	e23000	e14800	e13400	e13100	74800	57400	26400	33500	42700	e19500
4	e8870	e20900	e21400	e15300	e13400	e12700	85000	54700	25300	34000	41100	e21100
5	e8920	e21100	e20800	e15400	e13100	e13000	94800	52700	24800	34400	38300	e19800
6	e8980	e21000	e20700	e15600	e12700	e14000	107000	50100	e24700	35000	35400	e19100
7	e8280	e20800	e22200	e14500	e13100	e14400	118000	48100	e24700	35300	32400	e17400
8	e8750	e21500	e22700	e13800	e13600	e14500	131000	47100	e23300	36200	29900	e16700
9	e8380	e21500	e21600	e13700	e13300	e16100	142000	45500	e22200	36400	27700	e16000
10	e8100	e21100	e20900	e12900	e12700	e17400	150000	43100	e21500	35900	26000	e15700
11	e8400	e21500	e21100	e13000	e13300	e18100	156000	42100	e20500	35500	e24100	e15400
12	e8600	e21200	e21300	e13200	e12800	e18700	159000	40800	e19700	35100	e23200	e15100
13	e8250	e20000	e21900	e12100	e12500	e20000	159000	39600	e19200	35100	e21800	e14400
14	e8200	e17700	e22300	e11600	e12200	e21400	155000	39100	e18400	35400	e20900	e14000
15	e7610	e16500	e21500	e11900	e12700	e22800	148000	38600	e17000	35200	e19900	e14100
16	e7910	e16400	e19500	e12300	e12900	e23900	139000	37300	e16500	36100	e19200	e13700
17	e7730	e16200	e18200	e13000	e12600	e24300	129000	36200	e16000	e36800	e19000	e13700
18	e9000	e21300	e16800	e14400	e12500	e24800	120000	35300	e15700	e37200	e19300	e14200
19	e9870	e25000	e16600	e13100	e12200	e25000	113000	34600	e15300	e36900	e19000	e14900
20	e10800	e28300	e16100	e13400	e12600	e25200	105000	33300	e14700	e34600	23700	e15200
21	e10700	e30900	e14700	e13200	e12200	e25600	99200	32200	e14400	e33900	25000	e14800
22	e10900	e32000	e13900	e13300	e12900	e25900	93300	30800	e14000	e32100	26100	e14700
23	e12700	e31900	e14500	e13200	e12900	27100	87300	29600	e13700	e33100	25400	e14500
24	e13700	e28800	e16300	e13800	e12900	30000	82300	29600	e13100	e34200	25100	e14100
25	e14900	e27700	e15800	e13900	e12600	32100	78100	28100	e14200	38600	25000	e14300
26	e16500	e25800	e15300	e13400	e12600	32700	74700	27100	e13700	40600	24600	e14000
27	e17000	e23000	e14400	e13400	e12600	34300	71900	26900	e16200	43100	e23400	e13200
28	e17000	e20800	e15000	e13200	e12900	36900	69400	27600	e17600	45000	e22300	e13200
29	e17300	e19800	e15300	e13400	---	41300	67000	27900	e19300	46000	e21600	e13800
30	e18100	e21400	e15600	e13300	---	46600	64900	28000	e20300	45900	e20900	e13100
31	e18500	---	e15800	e13200	---	53000	---	27900	---	45400	e20400	---
TOTAL	340120	676200	581200	421100	358600	750700	3199200	1212000	576800	1132400	832600	469100
MEAN	10970	22540	18750	13580	12810	24220	106600	39100	19230	36530	26860	15640
MAX	18500	32000	23700	15600	13600	53000	159000	61400	27500	46000	45000	21100
MIN	7610	16200	13900	11600	12200	12700	59300	26900	13100	24900	19000	13100
AC-FT	674600	1341000	1153000	835300	711300	1489000	6346000	2404000	1144000	2246000	1651000	930500
CFSM	.24	.50	.42	.30	.29	.54	2.38	.87	.43	.82	.60	.35
IN.	.28	.56	.48	.35	.30	.62	2.66	1.01	.48	.94	.69	.39

e Estimated

UPPER MISSISSIPPI RIVER BASIN

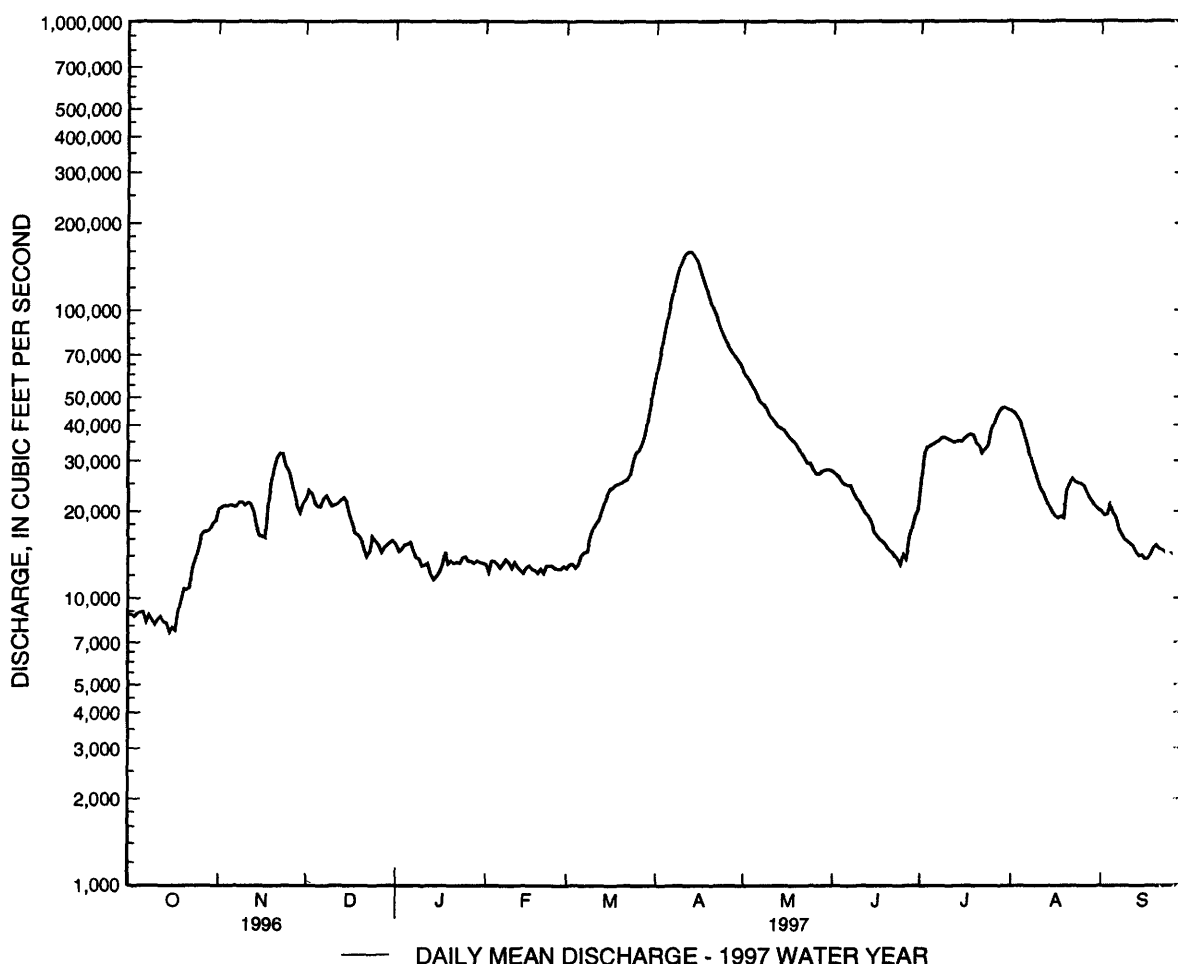
05344500 MISSISSIPPI RIVER AT PRESCOTT, WI--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1928 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	13550	13290	9943	8275	8115	17270	41370	32150	25720	20440	13430	12920
MAX	49740	40360	21460	16060	21390	55010	117600	90100	69890	87420	48350	45950
(WY)	1987	1972	1983	1983	1966	1983	1965	1986	1993	1993	1993	1986
MIN	3526	3874	3379	3153	3519	4369	7215	6304	4185	3197	2366	3002
(WY)	1933	1977	1934	1935	1934	1934	1931	1931	1934	1934	1934	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1928 - 1997
ANNUAL TOTAL	8737060	10550020	
ANNUAL MEAN	23870	28900	18080 ^a
HIGHEST ANNUAL MEAN			38540
LOWEST ANNUAL MEAN			4367
HIGHEST DAILY MEAN	81900	Apr 24	159000
LOWEST DAILY MEAN	7610	Oct 15	7610
ANNUAL SEVEN-DAY MINIMUM	8040	Sep 21	8100
INSTANTANEOUS PEAK FLOW			161000
INSTANTANEOUS PEAK STAGE			40.09
ANNUAL RUNOFF (AC-FT)	17330000	20930000	13100000
ANNUAL RUNOFF (CFSM)	.53	.65	.40
ANNUAL RUNOFF (INCHES)	7.25	8.76	5.48
10 PERCENT EXCEEDS	46400	51100	39400
50 PERCENT EXCEEDS	17600	20700	11800
90 PERCENT EXCEEDS	9860	12600	5090

a Median of annual mean discharges is 18260 ft³/s.



VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN

LOCATION.--Lat 44°40'00", long 93°03'17", in SW¼NW¼ sec. 24, T.114 N., R.19 W., Dakota County, Hydrologic Unit 07040001, on right bank and just downstream from County Road 79, 2 mi west of Empire and 4 mi northeast of Farmington.

DRAINAGE AREA.--110 mi².

PERIOD OF RECORD.--May 1942 to June 1945 (no record during July, August, and September 1944), September 1969 to September 1973 (discharge measurements only), October 1973 to current year. Prior to October 1975 published as "near Empire City".

GAGE.--Water-stage recorder. Datum of gage is 851.99 ft above mean sea level (levels by U.S. Army Corps of Engineers). April 12, 1942 to June 30, 1944, and October 1, 1944 to July 7, 1945, nonrecording gage at same site and present datum.

REMARKS.--Records good. Some regulation at low-flow by sewage plant upstream.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in April 1965, reached a stage of 7.5 ft, from information by local resident, discharge 6,200 ft³/s, from rating extended above 2,100 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Nov. 17	2330	326	5.80	July 27	0900	1220	7.81
Mar. 23	1600	380	6.04	Aug. 18	0445	313	5.75
Mar. 28	1920	547	6.56	Aug. 22	0215	941	7.38
July 04	0415	296	5.66	Sep. 19	0030	389	6.67
July 24	1245	*1290	*7.90				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	43	77	e99	55	51	51	238	86	66	138	238	208
2	43	68	e94	56	50	53	214	84	63	104	227	189
3	42	65	e90	56	50	54	194	87	61	203	218	173
4	44	65	e84	68	49	53	178	84	60	251	194	156
5	45	70	e80	73	49	51	173	84	62	129	183	146
6	47	65	77	69	49	50	199	81	64	99	167	137
7	47	63	74	70	49	51	199	79	64	89	166	131
8	48	59	71	68	49	51	157	91	64	88	159	124
9	47	56	70	67	48	54	146	87	61	96	147	126
10	47	53	69	66	49	62	141	82	60	88	136	163
11	47	52	68	e67	48	74	135	79	62	80	130	160
12	47	49	68	e63	47	85	130	78	80	78	122	133
13	47	48	69	60	47	83	126	75	67	81	123	124
14	47	46	67	58	47	72	123	75	61	85	119	116
15	47	51	66	58	46	78	118	74	62	106	121	113
16	71	117	65	e59	46	68	113	73	64	91	163	108
17	149	278	64	e57	46	71	108	71	61	79	244	172
18	117	289	63	e55	48	69	108	77	59	126	285	340
19	81	164	61	54	49	72	118	78	62	149	207	341
20	69	125	61	53	50	85	114	72	63	131	220	218
21	65	106	61	54	52	120	109	69	62	196	495	177
22	65	100	60	55	52	203	105	70	59	249	769	153
23	86	93	61	e53	50	338	100	69	58	491	494	140
24	85	86	e62	e52	48	358	96	80	58	978	387	139
25	73	80	e59	e51	49	307	93	84	65	611	323	134
26	70	76	e58	e50	50	263	90	76	64	510	263	128
27	64	e74	56	e49	49	341	89	72	58	997	226	120
28	62	e78	57	e48	49	496	92	69	55	611	203	117
29	70	e86	56	48	---	453	89	71	63	436	181	116
30	110	e96	56	50	---	350	88	72	135	342	166	111
31	93	---	55	52	---	280	---	69	---	277	182	---
TOTAL	2018	2735	2101	1794	1366	4796	3983	2398	1943	7989	7258	4713
MEAN	65.1	91.2	67.8	57.9	48.8	155	133	77.4	64.8	258	234	157
MAX	149	289	99	73	52	496	238	91	135	997	769	341
MIN	42	46	55	48	46	50	88	69	55	78	119	108
AC-FT	4000	5420	4170	3560	2710	9510	7900	4760	3850	15850	14400	9350
CFSM	.15	.21	.15	.13	.11	.35	.30	.18	.15	.58	.53	.36
IN.	.17	.23	.18	.15	.11	.40	.34	.20	.16	.67	.61	.40

e Estimated

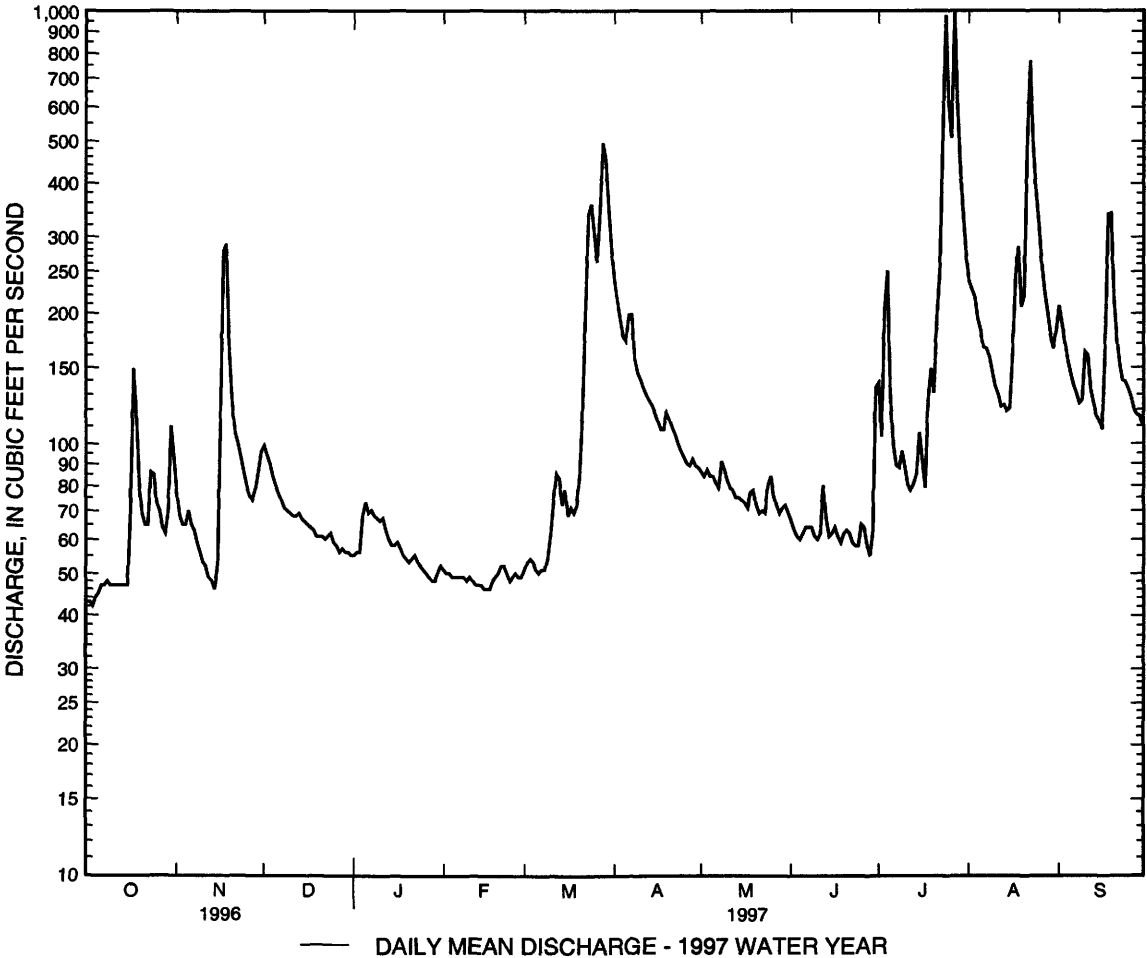
VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	53.1	48.8	38.6	30.6	34.5	100	101	87.0	85.2	65.4	55.5	72.0
MAX	160	133	79.5	57.9	85.2	199	244	223	290	258	234	213
(WY)	1995	1993	1993	1997	1984	1983	1983	1986	1993	1997	1997	1992
MIN	14.9	15.6	12.4	11.0	13.1	25.4	35.2	29.3	23.0	16.0	14.3	14.6
(WY)	1977	1977	1977	1977	1977	1975	1977	1977	1988	1988	1976	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1942 - 1997
ANNUAL TOTAL	26633	43094	
ANNUAL MEAN	72.8	118	64.2
HIGHEST ANNUAL MEAN			142
LOWEST ANNUAL MEAN			23.6
HIGHEST DAILY MEAN	319	Mar 14	997
LOWEST DAILY MEAN	28	Feb 2	42
ANNUAL SEVEN-DAY MINIMUM	30	Jan 29	44
INSTANTANEOUS PEAK FLOW			1290
INSTANTANEOUS PEAK STAGE			7.90
INSTANTANEOUS LOW FLOW			35
ANNUAL RUNOFF (AC-FT)	52830	85480	46500
ANNUAL RUNOFF (CFSM)	.16	.27	.15
ANNUAL RUNOFF (INCHES)	2.24	3.63	125
50 PERCENT EXCEEDS	61	76	42
90 PERCENT EXCEEDS	35	49	20



VERMILLION RIVER BASIN

05345000 VERMILLION RIVER NEAR EMPIRE, MN--Continued

(National Water Quality Assessment Station),

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
MAR 21...	1340	120	696	7.7	4.5	734	11.2	91	225	274	

DATE	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAR 21...	<0.015	<0.010	<0.20	0.60	<0.050	0.470	<0.010	<0.010	32	81

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CANNON RIVER BASIN

05353800 STRAIGHT RIVER NEAR FARIBAULT, MN

LOCATION.--Lat 44°15'29", long 93°13'51", in NW¼SE¼ sec. 9, T.109 N., R.20 W., Rice County, Hydrologic Unit 07040002, on right bank 15 ft downstream from highway bridge, 2.8 mi upstream from Falls Creek and 3.2 mi southeast of Faribault.

DRAINAGE AREA.--442 mi².

PERIOD OF RECORD.--October 1965 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,034.58 ft above mean sea level.

REMARKS.--Records good except those for estimated daily discharges, which are fair.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 23	0500	3030	8.91	Aug. 15	1300	*5690	*11.01
Mar. 28	0400	2440	8.21	Aug. 20	0800	2290	8.03
July 25	1500	3520	9.40	Aug. 30	1600	3490	9.37

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	47	148	e400	e140	e110	e128	1260	269	354	192	466	1410
2	46	128	e390	e140	e110	e121	1070	275	321	171	403	1060
3	43	120	e370	e160	e105	e140	935	310	293	149	348	806
4	44	114	e342	e160	e105	e160	833	332	271	136	306	652
5	44	127	e350	e150	e100	e145	802	327	264	122	269	566
6	41	137	e320	e145	e100	e132	975	297	249	125	276	504
7	40	147	e290	e135	e100	e125	968	283	235	109	244	453
8	41	147	e280	e135	e97	e131	854	315	228	114	220	419
9	41	140	e260	e140	e97	e175	707	316	208	104	200	387
10	44	131	e250	e135	e97	e486	629	300	199	96	188	347
11	43	117	e230	e130	e96	e750	579	282	188	95	173	316
12	42	e110	e210	e130	e92	e960	546	264	181	e200	192	289
13	42	e105	e195	e125	e92	e1020	516	249	166	e480	181	266
14	40	e100	e180	e125	e90	e1020	477	250	153	e950	190	251
15	42	e120	e175	e120	e90	e970	439	234	145	893	3690	242
16	62	e280	e170	e120	e88	e870	404	221	144	735	2200	292
17	56	829	e185	e115	e88	e820	378	215	134	766	1600	465
18	55	1010	e185	e110	e87	e810	390	212	135	886	1120	397
19	49	937	e180	e110	e88	e820	489	208	134	1090	843	346
20	49	739	e170	e110	e88	e860	490	198	138	1170	1900	303
21	46	e510	e170	e110	e90	e1300	461	186	220	1000	1380	275
22	49	e390	e170	e116	e88	e2600	423	180	229	1170	1040	260
23	136	e340	e165	e120	e88	2940	388	175	212	975	891	322
24	149	e300	e165	e115	e87	2830	361	305	270	884	787	331
25	175	e290	e155	e110	e98	2330	335	589	257	2460	668	329
26	146	e270	e155	e110	e112	1950	309	696	201	2080	575	299
27	122	e270	e155	e105	e110	2190	300	567	171	1470	505	276
28	107	e270	e150	e105	e106	2370	296	451	157	1090	449	263
29	111	e320	e145	e105	---	2110	274	426	198	810	396	241
30	137	e360	e140	e105	---	1780	266	414	200	646	2270	223
31	149	---	e140	e110	---	1490	---	392	---	537	2040	---
TOTAL	2238	9006	6842	3846	2699	34533	17154	9738	6255	21705	26010	12590
MEAN	72.2	300	221	124	96.4	1114	572	314	209	700	839	420
MAX	175	1010	400	160	112	2940	1260	696	354	2460	3690	1410
MIN	40	100	140	105	87	121	266	175	134	95	173	223
AC-FT	4440	17860	13570	7630	5350	68500	34020	19320	12410	43050	51590	24970
CFSM	.16	.68	.50	.28	.22	2.52	1.29	.71	.47	1.58	1.90	.95
IN.	.19	.76	.58	.32	.23	2.91	1.44	.82	.53	1.83	2.19	1.06

e Estimated

CANNON RIVER BASIN

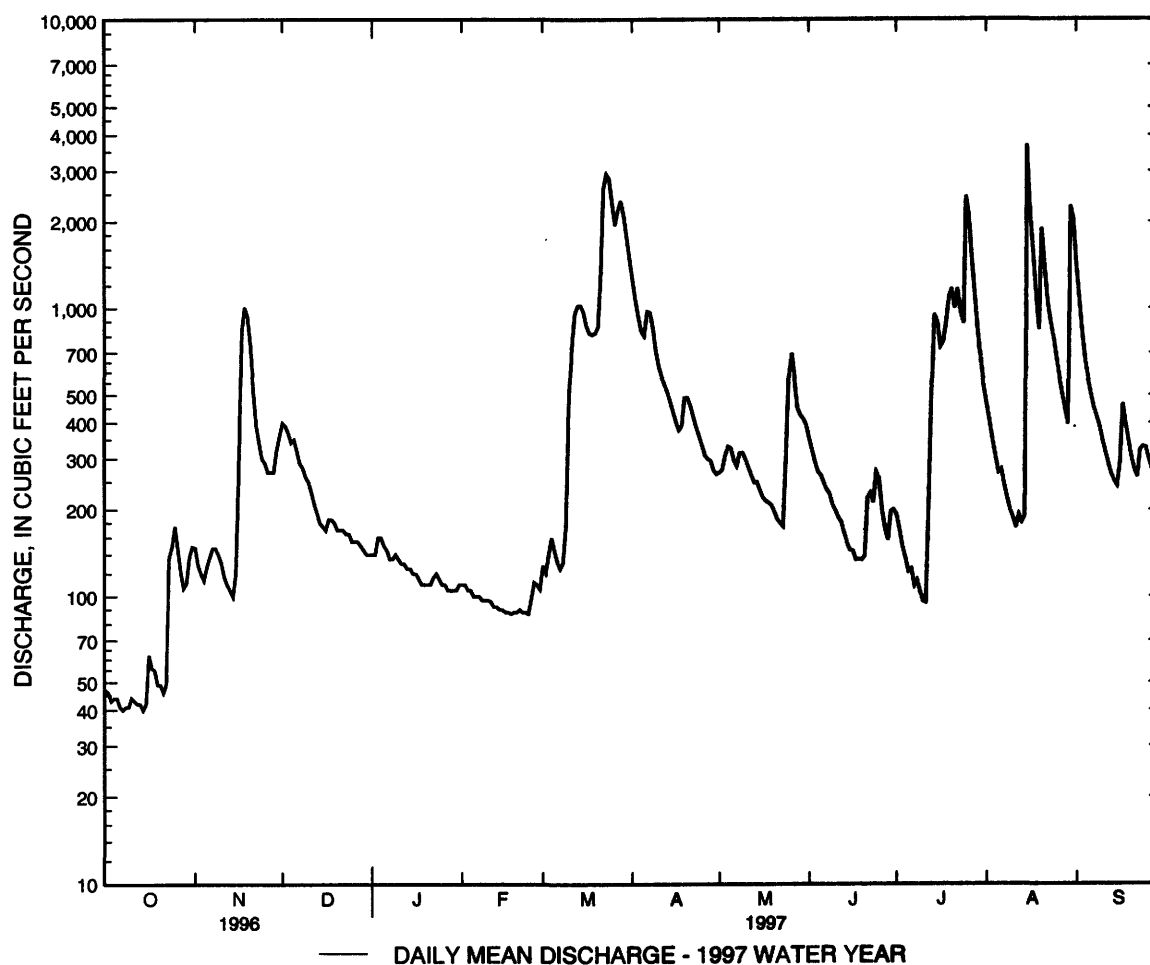
05353800 STRAIGHT RIVER NEAR FARIBAULT, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	226	200	123	70.4	110	540	618	427	366	303	236	181
MAX	831	595	336	167	837	1270	1912	1224	1399	1027	1136	645
(WY)	1969	1971	1983	1992	1984	1973	1993	1973	1993	1993	1979	1993
MIN	17.0	15.1	11.0	11.0	12.9	26.4	70.2	58.1	45.8	26.2	16.2	16.0
(WY)	1977	1977	1977	1977	1968	1968	1977	1976	1976	1988	1976	1976

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1966 - 1997
ANNUAL TOTAL	84591	152616	
ANNUAL MEAN	231	418	284
HIGHEST ANNUAL MEAN			754
LOWEST ANNUAL MEAN			43.9
HIGHEST DAILY MEAN	2540	Mar 30	3690
LOWEST DAILY MEAN	40	Oct 7	40
ANNUAL SEVEN-DAY MINIMUM	42	Oct 6	42
INSTANTANEOUS PEAK FLOW		5690	Aug 15
INSTANTANEOUS PEAK STAGE		11.01	Aug 15
INSTANTANEOUS LOW FLOW		38	Oct 14
ANNUAL RUNOFF (AC-FT)	167800	302700	205800
ANNUAL RUNOFF (CFSM)	.52	.95	.64
ANNUAL RUNOFF (INCHES)	7.12	12.84	8.73
10 PERCENT EXCEEDS	422	975	709
50 PERCENT EXCEEDS	137	229	125
90 PERCENT EXCEEDS	52	96	30

a Backwater from ice.



CANNON RIVER BASIN

05353800 STRAIGHT RIVER NEAR FARIBAULT, MN--Continued

(National Water Quality Assessment Station),

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE DIS IT FIELD MG/L AS HCO3 (00453)
------	------	---	--	--	---	---	--	---	--	---

MAR										
20...	1045	1100	549	7.6	0.5	736	12.3	88	217	265
23...	1450	2940	318	7.3	1.5	746	6.9	50	141	172

DATE	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
------	--	--	--	---	--	---	--	--	--	--

MAR										
20...	0.340	0.120	1.1	1.6	7.10	0.330	0.190	0.170	78	75
23...	0.370	0.050	1.2	2.0	5.40	0.450	0.250	0.220	203	42

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CANNON RIVER BASIN

05355200 CANNON RIVER AT WELCH, MN

LOCATION.--Lat 44°33'50", long 92°43'55", in NW¼SW¼, sec. 27, T. 113 N., R. 16 W., Goodhue County, on right bank 0.3 mile downstream from highway bridge at Welch and 1.8 miles upstream from Belle Creek.

DRAINAGE AREA.--1,320 mi², approximately.

PERIOD OF RECORD.--June 1909 to January 1914 (no winter records 1909-11), November 1930 to September 1971, October 1972 to September 1987 (annual maximum only), October 1991 to current year.

REVISED RECORDS.--WSP 1308: 1912(M). WSP 1508: 1933. WSP 1914: 1960.

GAGE.--Water-stage recorder. Datum of gage is 699.16 ft above mean sea level. Prior to Nov. 11, 1930, nonrecording gage on highway bridge at site 0.3 mile upstream at datum 3.00 ft lower. Nov. 11, 1930 to Oct. 11, 1938, water-stage recorder at site 0.3 mile upstream at present datum.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known, 17.1 ft, present datum, in April 1888, from floodmark at mill about 2,400 ft upstream.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Flow affected at lower stages by regulation from power plant upstream.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	275	345	728	e340	e350	409	3590	891	795	636	2300	4300
2	231	478	783	e360	e350	374	3280	858	747	653	1920	3430
3	200	393	797	e380	e355	442	2990	916	720	584	1770	2820
4	224	424	768	e405	e350	446	2610	886	687	562	1610	2590
5	234	458	745	e410	e350	449	2320	1010	662	537	1500	2310
6	258	460	736	e380	e355	446	2340	841	636	512	1470	1940
7	213	386	754	e350	e360	443	2360	820	624	487	1400	1800
8	237	443	728	e360	e355	443	2220	945	581	545	1290	1700
9	231	447	721	e370	e335	448	2060	817	577	499	1220	1690
10	218	414	596	e370	e355	453	1840	815	546	464	1130	1440
11	219	404	628	e360	e335	487	1720	829	536	472	1090	1350
12	217	400	616	e350	e335	879	1610	726	491	501	1090	1280
13	240	360	596	e350	e330	1880	1540	734	531	673	1020	1200
14	193	397	569	e345	e340	1980	1480	719	497	1100	987	1150
15	198	433	553	e335	e330	e1620	1310	632	493	1710	1930	1050
16	257	615	525	e330	e335	e1540	1240	640	471	1510	4640	1560
17	294	888	475	e330	e355	e1770	1210	601	395	1500	4700	2930
18	282	982	542	e330	e372	1480	1200	583	428	1700	3350	2410
19	190	1110	459	e330	e360	1450	1310	559	408	1940	3040	1820
20	205	1170	376	e335	401	1560	1290	539	406	2240	3660	1620
21	295	1130	e450	e350	414	1930	1300	527	547	2280	4780	1470
22	241	1040	e420	e370	437	3150	1210	499	837	2750	4070	1400
23	303	927	e405	e402	430	4510	1150	507	542	3720	3370	1390
24	362	855	e385	e370	452	4980	1050	528	561	3060	2900	1350
25	451	848	e370	e360	483	5080	1020	714	581	4260	2600	1250
26	334	836	e355	e360	493	4510	913	1020	549	8270	2330	1110
27	427	618	e340	e355	465	4440	875	993	486	6730	2140	1100
28	296	589	e335	e350	467	5060	847	889	465	4590	1950	1070
29	321	717	e335	e355	---	5140	945	863	727	3440	1800	1020
30	456	730	e335	e355	---	4680	881	829	723	2740	1950	912
31	286	---	e335	e350	---	4020	---	833	---	2470	4040	---
TOTAL	8388	19297	16760	11097	10649	66499	49711	23563	17249	63135	73047	52462
MEAN	271	643	541	358	380	2145	1657	760	575	2037	2356	1749
MAX	456	1170	797	410	493	5140	3590	1020	837	8270	4780	4300
MIN	190	345	335	330	330	374	847	499	395	464	987	912
AC-FT	16640	38280	33240	22010	21120	131900	98600	46740	34210	125200	144900	104100
CFSM	.20	.49	.41	.27	.29	1.63	1.26	.58	.44	1.54	1.79	1.32
IN.	.24	.54	.47	.31	.30	1.87	1.40	.66	.49	1.78	2.06	1.48

e Estimated

CANNON RIVER BASIN

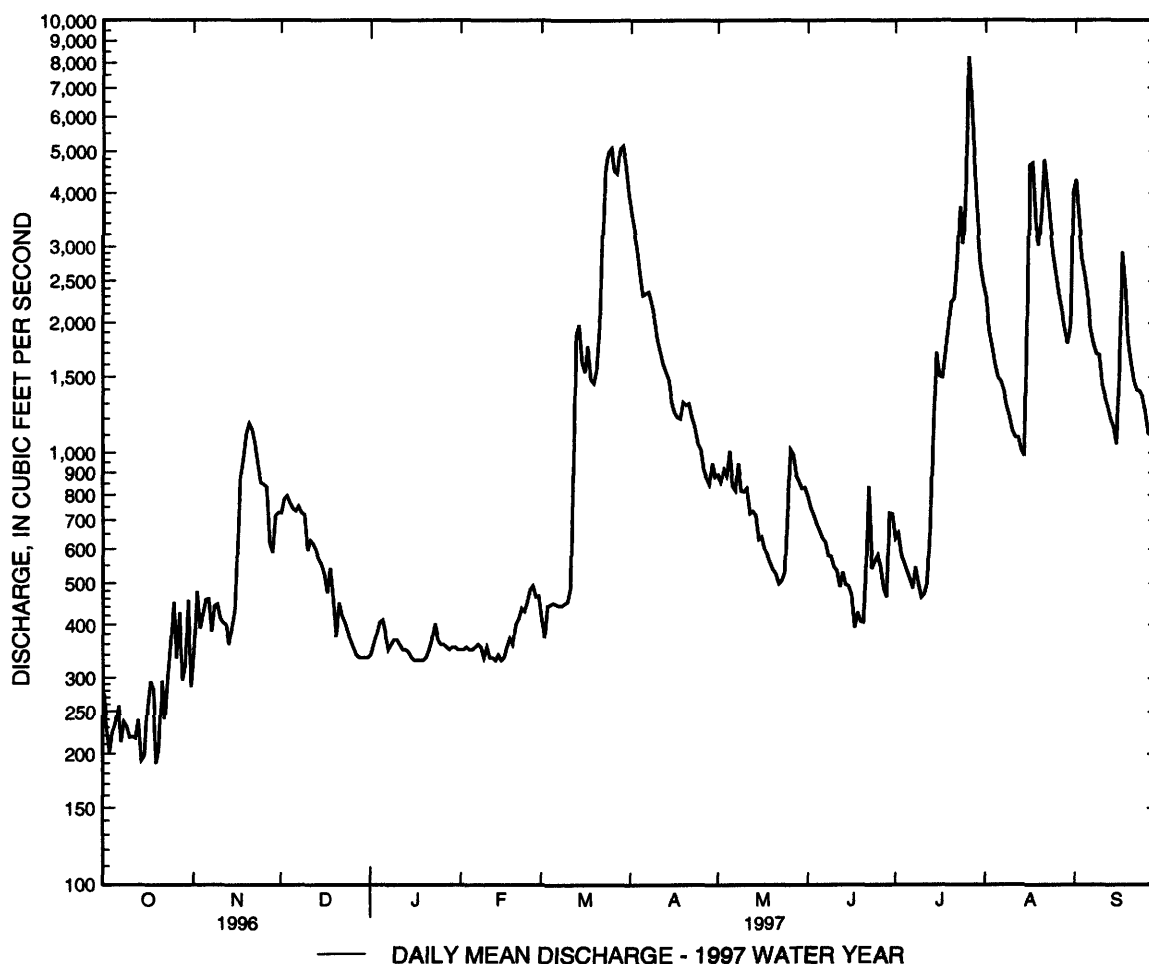
05355200 CANNON RIVER AT WELCH, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	370	361	283	233	290	989	1317	728	744	556	437	390
MAX	1806	1708	1105	662	1141	2627	8240	2966	4144	3343	2951	1823
(WY)	1969	1971	1992	1992	1966	1992	1965	1944	1993	1993	1993	1993
MIN	65.5	78.8	75.0	76.9	110	149	145	84.9	80.0	71.2	78.1	72.8
(WY)	1934	1934	1938	1938	1913	1911	1911	1934	1934	1934	1936	1933

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1909 - 1997
ANNUAL TOTAL	256315	411857	
ANNUAL MEAN	700	1128	581
HIGHEST ANNUAL MEAN			2132
LOWEST ANNUAL MEAN			137
HIGHEST DAILY MEAN	4510	Mar 31	8270
LOWEST DAILY MEAN	190	Oct 19	190
ANNUAL SEVEN-DAY MINIMUM	217	Oct 9	217
INSTANTANEOUS PEAK FLOW			9050
INSTANTANEOUS PEAK STAGE			10.53
INSTANTANEOUS LOW FLOW			175a
ANNUAL RUNOFF (AC-FT)	508400	816900	420600
ANNUAL RUNOFF (CFSM)	.53	.85	.44
ANNUAL RUNOFF (INCHES)	7.22	11.61	5.98
10 PERCENT EXCEEDS	1320	2660	1250
50 PERCENT EXCEEDS	491	636	263
90 PERCENT EXCEEDS	245	335	99

a Result of regulation.



CANNON RIVER BASIN

05355200 CANNON RIVER AT WELCH, MN--Continued

(National Water Quality Assessment Station),

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
MAR										
20...	1550	1790	525	8.0	2.5	742	13.6	102	203	248
23...	1655	4690	415	7.7	2.0	749	8.1	60	159	194

DATE	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAR										
20...	0.390	0.070	1.3	1.8	5.40	0.300	0.200	0.180	29	45
23...	0.400	0.050	1.1	1.8	4.90	0.400	0.260	0.170	139	52

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UPPER MISSISSIPPI RIVER BASIN
05355250 MISSISSIPPI RIVER AT RED WING, MN

LOCATION.--Lat 44°34'13", long 92°32'02", in NE¼NE¼ sec. 30, T.113 N., R.14 W., Goodhue County, Hydrologic Unit 07040001, at bridge on U.S. Highway 63 in Red Wing, 6.3 mi downstream from Lock and Dam 3, and at mile 790.6 upstream from Ohio River.

DRAINAGE AREA.--46,800 mi², approximately.

PERIOD OF RECORD.--October 1996 to September 1997.

REMARKS.--Water-discharge computed on the basis of discharge for Mississippi River at Prescott, WI (station 05344500) combined with Cannon River at Welch (station 05355200) and adjusted for inflow.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9240	21100	23500	15900	13700	13400	64200	63400	28800	26000	48300	25100
2	9160	21600	25000	15100	12900	13700	70900	61200	28200	32200	47100	23500
3	8990	21800	24300	15500	14000	13800	79400	59400	27600	34700	45400	22900
4	9270	21700	22600	16000	14000	13400	89300	56600	26500	35200	43600	24300
5	9330	22000	22000	16100	13700	13700	99000	54700	25900	35600	40600	22700
6	9420	21900	21900	16300	13300	14700	111000	51900	25800	36200	37600	21600
7	8650	21600	23400	15100	13700	15100	123000	49800	25800	36400	34500	19700
8	9160	22400	23900	14400	14200	15200	136000	48900	24300	37400	31800	18800
9	8780	22400	22800	14300	13900	16900	147000	47200	23200	37600	29500	18100
10	8480	21900	21900	13500	13300	18200	155000	44700	22500	37000	27700	17500
11	8780	22300	22100	13600	13900	18900	161000	43700	21400	36600	25700	17100
12	8980	22000	22300	13800	13400	20000	163000	42300	20600	36200	24800	16800
13	8650	20700	22900	12700	13100	22400	163000	41100	20100	36400	23300	16000
14	8550	18400	23300	12200	12800	23900	159000	40600	19300	37200	22300	15500
15	7960	17300	22500	12500	13300	25300	152000	39900	17800	37700	22400	15500
16	8330	17400	20400	12900	13500	26500	143000	38600	17300	38400	24600	15600
17	8180	17400	19000	13600	13200	26700	133000	37500	16700	39100	24500	17100
18	9460	22700	17700	15000	13100	26800	123000	36500	16400	39700	23300	17100
19	10200	26600	17400	13700	12800	27000	116000	35800	16000	39700	22700	17100
20	11200	30100	16800	14000	13300	27300	108000	34500	15400	37600	28100	17200
21	11200	32700	15400	13800	12900	28200	102000	33300	15200	37000	30700	16700
22	11300	33700	14600	13900	13600	29800	96200	31900	15200	35700	31000	16500
23	13200	33500	15200	13900	13600	32500	90000	30700	14500	37700	29500	16300
24	14300	30200	17000	14400	13600	36000	84900	30700	13900	38100	28700	15800
25	15600	29100	16500	14500	13300	38200	80500	29400	15100	43900	28300	15900
26	17100	27200	15900	14000	13400	38200	77000	28700	14500	50400	27600	15500
27	17800	24100	15000	14000	13300	39800	74100	28400	17000	51200	26100	14600
28	17600	21800	15600	13800	13600	43100	71500	29000	18400	50800	24800	14600
29	17900	20900	15900	14000	---	47600	69200	29300	20400	50600	23900	15200
30	18900	22600	16200	13900	---	52500	67000	29400	21400	49700	23400	14300
31	19100	---	16400	13800	---	58300	---	29300	---	48900	25200	---
TOTAL	354770	709100	609400	440200	376400	837100	3308200	1258400	605200	1220900	927000	534600
MEAN	11440	23640	19660	14200	13440	27000	110300	40590	20170	39380	29900	17820
MAX	19100	33700	25000	16300	14200	58300	163000	63400	28800	51200	48300	25100
MIN	7960	17300	14600	12200	12800	13400	64200	28400	13900	26000	22300	14300
AC-FT	703700	1406000	1209000	873100	746600	1660000	6562000	2496000	1200000	2422000	1839000	1060000
CFSM	367	758	630	455	431	865	3530	1300	647	1260	958	571
IN.	422.99	845.47	726.59	524.85	448.78	998.08	3944.39	1500.40	721.58	1455.69	1105.27	637.41

UPPER MISSISSIPPI RIVER BASIN

05355250 MISSISSIPPI RIVER AT RED WING, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 1997, BY WATER YEAR (WY)

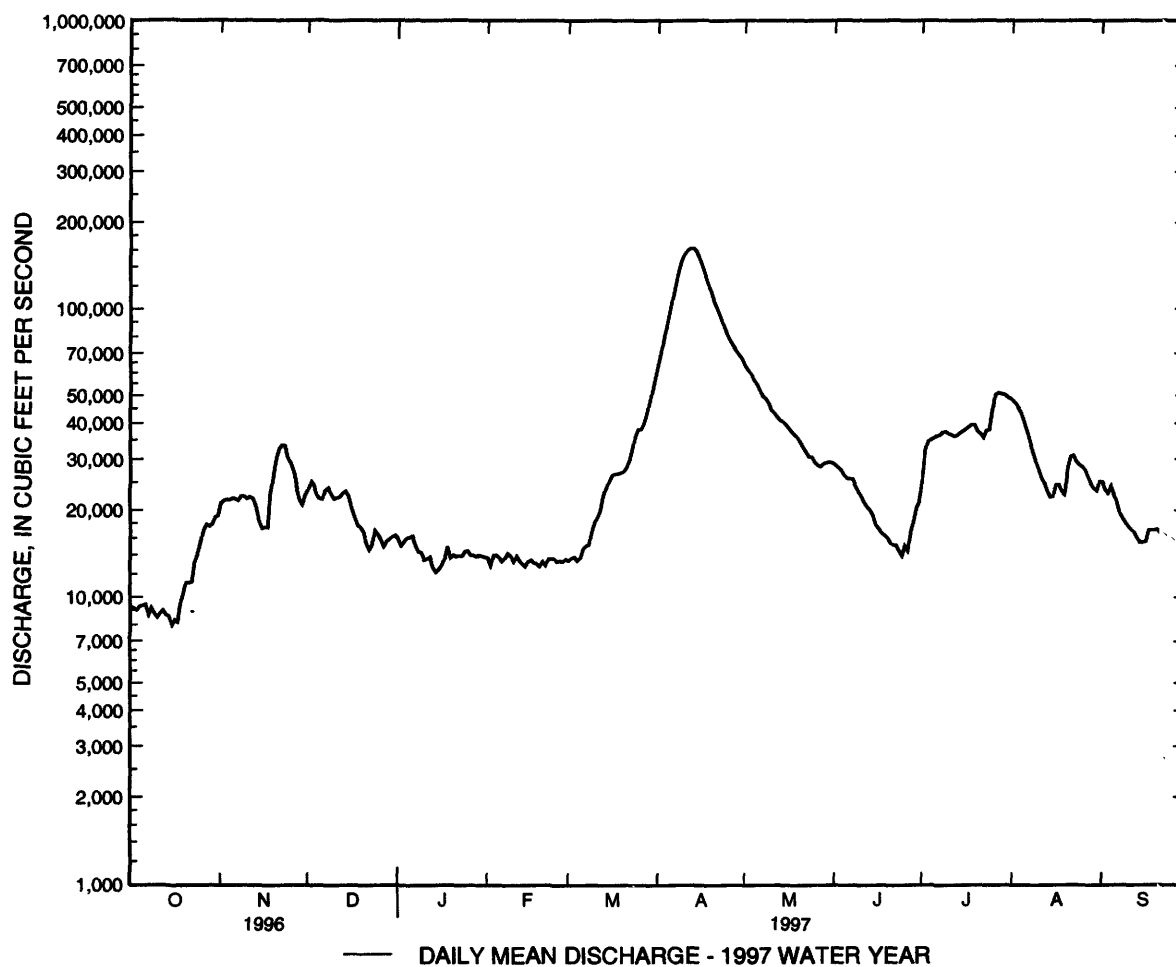
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	11440	23640	19660	14200	13440	27000	110300	40590	20170	39380	29900	17820
MAX	11440	23640	19660	14200	13440	27000	110300	40590	20170	39380	29900	17820
(WY)	1997	1997	1997	1997	1997	1997	1997	1997	1997	1997	1997	1997
MIN	11440	23640	19660	14200	13440	27000	110300	40590	20170	39380	29900	17820
(WY)	1997	1997	1997	1997	1997	1997	1997	1997	1997	1997	1997	1997

SUMMARY STATISTICS

FOR 1997 WATER YEAR

WATER YEARS 1996 - 1997

ANNUAL TOTAL	11181270			
ANNUAL MEAN	30630			
HIGHEST ANNUAL MEAN		30630		1997
LOWEST ANNUAL MEAN		30630		1997
HIGHEST DAILY MEAN	163000	Apr 12	163000	Apr 12 1997
LOWEST DAILY MEAN	7960	Oct 15	7960	Oct 15 1996
ANNUAL SEVEN-DAY MINIMUM	8490	Oct 11	8490	Oct 11 1996
ANNUAL RUNOFF (AC-FT)	22180000		22190000	
ANNUAL RUNOFF (CFSM)	982		982	
ANNUAL RUNOFF (INCHES)	13331.51		13340.37	
10 PERCENT EXCEEDS	53400		51800	
50 PERCENT EXCEEDS	22100		21800	
90 PERCENT EXCEEDS	13300		11500	



DAY	MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN		MAX	MIN	MEAN
	FEBRUARY				MARCH				APRIL				MAY		
1	---	---	---		---	---	---		---	---	---		---	---	---
2	---	---	---		---	---	---		---	---	---		---	---	---
3	---	---	---		---	---	---		---	---	---		---	---	---
4	---	---	---		---	---	---		---	---	---		---	---	---
5	---	---	---		---	---	---		---	---	---		---	---	---
6	---	---	---		---	---	---		---	---	---		---	---	---
7	---	---	---		---	---	---		---	---	---		---	---	---
8	---	---	---		---	---	---		---	---	---		---	---	---
9	---	---	---		---	---	---		---	---	---		---	---	---
10	---	---	---		---	---	---		---	---	---		---	---	---
11	---	---	---		---	---	---		---	---	---		---	---	---
12	---	---	---		---	---	---		---	---	---		---	---	---
13	---	---	---		---	---	---		---	---	---		13.0	12.5	12.5
14	---	---	---		---	---	---		---	---	---		12.5	12.0	12.5
15	---	---	---		---	---	---		---	---	---		12.0	11.5	11.5
16	---	---	---		---	---	---		---	---	---		12.5	11.5	11.5
17	---	---	---		---	---	---		---	---	---		13.5	12.0	12.5
18	---	---	---		---	---	---		---	---	---		14.5	13.0	14.0
19	---	---	---		---	---	---		---	---	---		14.0	14.0	14.0
20	---	---	---		---	---	---		---	---	---		14.5	13.0	14.0
21	---	---	---		---	---	---		---	---	---		16.0	14.0	15.0
22	---	---	---		---	---	---		---	---	---		16.5	15.0	15.5
23	---	---	---		---	---	---		---	---	---		16.5	15.0	15.5
24	---	---	---		---	---	---		---	---	---		16.5	15.5	16.0
25	---	---	---		---	---	---		---	---	---		16.5	15.5	16.0
26	---	---	---		---	---	---		---	---	---		16.0	15.0	15.5
27	---	---	---		---	---	---		---	---	---		16.5	15.0	15.5
28	---	---	---		---	---	---		---	---	---		16.5	15.5	15.5
29	---	---	---		---	---	---		---	---	---		15.5	15.0	15.0
30	---	---	---		---	---	---		---	---	---		16.5	14.5	15.5
31	---	---	---		---	---	---		---	---	---		18.0	16.0	17.0
MONTH	---	---	---		---	---	---		---	---	---		---	---	---

UPPER MISSISSIPPI RIVER BASIN
05355250 MISSISSIPPI RIVER AT RED WING, MN--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	19.0	17.0	17.5	26.5	25.0	25.5	25.5	24.5	25.0	25.0	24.0	24.5
2	19.5	17.5	18.5	26.0	23.0	24.5	26.0	25.0	25.5	25.0	24.0	24.5
3	20.0	18.5	19.0	23.0	21.0	21.5	26.0	25.5	26.0	24.5	23.0	23.5
4	21.0	19.5	20.0	21.5	20.5	21.0	26.5	25.5	26.0	23.5	22.5	22.5
5	21.5	20.0	21.0	22.0	21.0	21.5	26.0	25.5	25.5	23.0	22.0	22.5
6	22.0	20.5	21.5	22.0	21.0	21.5	26.0	25.0	25.5	23.5	22.5	23.0
7	22.0	21.0	21.5	21.5	20.5	21.0	26.5	25.0	25.5	23.5	22.5	23.0
8	22.0	21.0	21.5	20.5	20.0	20.0	26.0	25.0	25.5	22.5	22.5	22.5
9	23.0	21.0	22.0	21.0	19.5	20.5	25.5	24.0	25.0	22.5	22.0	22.5
10	23.5	22.0	22.5	21.5	20.5	21.0	25.0	24.0	24.5	22.0	21.5	22.0
11	24.0	22.5	23.0	22.0	20.5	21.5	24.0	23.0	23.5	22.0	21.5	21.5
12	24.0	23.0	23.5	23.0	21.5	22.5	24.0	23.0	23.5	22.0	21.5	21.5
13	24.5	23.5	24.0	24.5	22.5	23.5	23.5	23.0	23.5	21.5	21.0	21.5
14	24.5	23.5	24.0	25.0	24.0	24.5	23.5	22.0	22.5	21.5	21.0	21.5
15	24.0	23.0	23.5	25.5	24.0	25.0	23.0	22.0	22.5	21.5	21.5	21.5
16	23.5	22.5	23.0	27.0	25.0	26.0	24.0	22.5	23.5	21.5	21.0	21.5
17	22.5	22.0	22.5	27.0	26.0	26.5	24.0	22.5	23.0	21.0	20.5	20.5
18	22.5	22.0	22.0	27.0	26.0	26.5	22.5	21.5	22.0	21.0	20.5	21.0
19	22.0	22.0	22.0	26.5	25.5	26.0	21.5	20.5	21.0	21.5	21.0	21.0
20	22.5	22.0	22.0	26.5	25.0	25.5	20.5	20.0	20.5	21.0	20.0	20.5
21	24.0	22.5	23.0	26.5	25.5	26.0	21.5	20.0	20.5	20.0	19.5	19.5
22	24.5	23.5	24.0	25.5	24.0	24.5	22.0	20.5	21.0	19.5	19.0	19.0
23	25.0	24.5	24.5	24.5	23.5	24.0	22.0	20.5	21.5	19.0	19.0	19.0
24	25.5	25.0	25.5	24.5	24.0	24.0	22.5	21.0	22.0	19.0	18.5	19.0
25	25.5	24.5	25.0	24.5	23.5	24.0	22.5	21.5	22.0	19.0	18.5	19.0
26	25.5	25.0	25.0	25.5	24.5	25.0	23.5	22.0	22.5	19.5	19.0	19.0
27	26.0	25.0	25.5	25.5	25.0	25.5	24.0	22.5	23.5	19.5	19.0	19.0
28	26.0	24.5	25.5	26.0	25.5	25.5	24.5	23.0	24.0	19.0	18.5	19.0
29	24.5	24.0	24.0	26.0	25.5	25.5	24.5	23.0	23.5	19.0	17.5	18.0
30	25.0	23.5	24.0	26.0	25.5	25.5	24.0	23.0	23.5	17.5	17.5	17.5
31	---	---	---	25.5	25.0	25.5	25.0	23.5	24.0	---	---	---
MONTH	26.0	17.0	22.7	27.0	19.5	23.9	26.5	20.0	23.5	25.0	17.5	21.0

UPPER MISSISSIPPI RIVER BASIN

05355250 MISSISSIPPI RIVER AT RED WING, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND-ARD UNITS) (00403)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	
OCT 07...	1100	9300	436	445	8.6	8.2	16.5	750	10.4	108	
NOV 14...	1235	19800	412	433	8.1	7.9	2.5	766	12.9	94	
DEC 03...	1015	26000	458	481	7.8	7.8	0.5	751	9.9	70	
JAN 02...	1000	16300	457	470	7.6	7.8	1.5	737	11.7	86	
FEB 03...	1030	15100	456	474	7.5	7.8	0.5	755	11.1	78	
MAR 12...	1100	21400	531	499	7.6	7.8	2.5	758	11.6	86	
APR 15...	1300	164000	362	376	7.7	7.6	4.5	746	11.8	94	
29...	1225	74500	426	447	8.1	8.2	12.5	736	11.0	107	
MAY 12...	1200	45500	481	500	8.5	7.8	12.5	741	10.6	103	
JUN 02...	1322	30300	522	523	8.3	8.2	18.0	741	10.2	110	
16...	1150	18600	536	533	8.4	8.4	22.5	--	7.9	94	
JUL 07...	1315	39200	506	494	8.0	8.1	21.0	747	7.6	88	
14...	1230	40000	489	470	8.1	8.1	24.5	744	7.5	92	
AUG 06...	1215	40300	526	526	8.0	8.1	25.0	751	6.8	84	
SEP 05...	1050	24100	479	463	8.2	8.3	21.5	746	7.9	93	
DATE		HARD-NESS TOTAL (MG/L AS CaCO3) (00900)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CaCO3) (39086)	ALKA-LINITY LAB (MG/L AS CaCO3) (90410)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
OCT 07...	180	155	160	182	0.020	0.020	0.40	1.1	0.820	0.200	
NOV 14...	190	142	154	173	0.070	0.020	0.50	0.70	1.30	0.100	
DEC 03...	200	156	160	190	0.190	0.030	0.80	0.90	2.50	0.100	
JAN 02...	200	165	173	201	0.220	0.020	0.70	0.70	1.70	0.100	
FEB 03...	210	190	178	232	0.300	0.070	0.80	0.80	1.70	0.110	
MAR 12...	210	174	182	212	0.290	0.080	0.70	0.90	2.20	0.100	
APR 15...	180	113	114	138	0.240	0.040	0.70	1.0	2.00	0.160	
29...	210	134	144	159	<0.015	0.022	0.62	1.1	1.63	0.140	
MAY 12...	220	149	155	179	<0.015	0.013	0.69	1.3	0.798	0.134	
JUN 02...	240	174	185	212	<0.015	0.026	0.56	1.2	3.12	0.105	
16...	250	176	187	207	<0.015	0.029	0.37	1.1	1.60	0.114	
JUL 07...	200	164	172	200	<0.015	0.050	0.55	1.0	4.27	0.225	
14...	240	160	168	195	<0.015	0.029	0.61	0.81	2.61	0.233	
AUG 06...	250	172	192	210	0.020	0.032	0.60	1.2	2.21	0.227	
SEP 05...	220	183	186	223	0.015	0.021	0.51	1.0	1.33	0.186	

UPPER MISSISSIPPI RIVER BASIN
05355250 MISSISSIPPI RIVER AT RED WING, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
OCT 07...	0.100	0.090	6.6	3.0	42	18	18	0.6	2.6	24
NOV 14...	0.060	0.060	7.6	0.70	45	18	12	0.4	2.5	16
DEC 03...	0.070	0.070	8.1	0.70	49	18	18	0.6	2.8	28
JAN 02...	0.090	0.080	8.0	0.40	49	19	13	0.4	2.5	19
FEB 03...	0.080	0.090	6.4	0.30	52	19	17	0.5	2.4	22
MAR 12...	0.080	0.100	6.2	0.60	53	19	17	0.5	2.6	26
APR 15...	0.080	0.080	7.8	2.0	45	16	6.9	0.2	3.7	9.2
29...	0.047	0.042	8.4	0.30	52	20	9.2	0.3	3.6	11
MAY 12...	<0.010	<0.010	7.9	2.9	52	23	12	0.3	3.2	14
JUN 02...	<0.010	0.016	6.8	1.9	58	23	12	0.3	2.7	16
16...	0.018	0.016	8.1	1.7	56	26	16	0.4	3.0	19
JUL 07...	0.092	0.093	7.0	2.3	51	18	9.6	0.3	2.4	16
14...	0.068	0.078	9.3	3.3	64	20	10	0.3	2.8	15
AUG 06...	0.102	0.113	9.1	1.1	61	23	11	0.3	3.4	16
SEP 05...	0.070	0.074	7.2	1.5	54	21	12	0.3	2.8	18

UPPER MISSISSIPPI RIVER BASIN

05355250 MISSISSIPPI RIVER AT RED WING, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	SULFATE DIS- SOLVED (MG/L AS SO ₄) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO ₂) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT									
07...	34	0.20	9.3	<3.0	2.0	266	245	48	77
NOV									
14...	43	0.20	11	49	29	260	239	9	99
DEC									
03...	36	0.20	13	85	33	276	270	11	88
JAN									
02...	37	0.20	14	100	44	285	261	44	88
FEB									
03...	33	0.20	15	74	62	289	283	6	81
MAR									
12...	34	0.20	15	44	56	298	282	12	85
APR									
15...	53	0.17	13	86	36	236	224	35	93
29...	67	0.18	11	85	8.9	289	263	44	93
MAY									
12...	77	0.17	5.1	52	7.8	318	279	81	97
JUN									
02...	61	0.25	7.4	14	3.6	335	299	36	93
16...	63	0.22	6.2	3.8	1.6	333	302	37	99
JUL									
07...	50	0.29	14	<3.0	1.5	346	279	90	99
14...	52	0.23	16	11	1.7	323	288	78	99
AUG									
06...	55	0.35	19	12	2.8	352	302	62	99
SEP									
05...	36	0.22	15	5.9	<1.0	303	274	45	100

ZUMBRO RIVER BASIN

05372995 SOUTH FORK ZUMBRO RIVER AT ROCHESTER, MN

LOCATION.--Lat 44°03'42", long 92°27'58", in NW¼NE¼ sec. 23, T.107 N., R.14 W., Olmsted County, Hydrologic Unit 07040004, on left bank 50 ft downstream from 37th Street bridge, 0.2 mi upstream from sewer plant, and 2.0 mi downstream from Silver Lake Dam.

DRAINAGE AREA.--303 mi².

PERIOD OF RECORD.--March 1981 to current year.

GAGE.--Water-stage recorder. Datum of gage is 950.00 ft above mean sea level.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Slight regulation at times from Silver Lake.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 6, 1978, reached a stage of about 28.0 ft, on upstream side of bridge, discharge 30,500 ft³/s. This is the highest known stage since at least 1908.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Mar. 11	1500	1710	7.12	July 18	1100	1380	6.45
Mar. 22	1100	*3000	*9.25	July 25	0700	1410	6.52
Mar. 28	0800	1630	6.95	July 26	0200	1380	6.45

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	53	75	116	60	71	120	610	272	167	123	341	231
2	45	69	107	65	71	115	582	267	163	116	311	205
3	43	71	110	69	e71	129	529	288	158	107	282	170
4	54	85	95	144	70	148	496	284	154	105	259	154
5	47	78	102	97	73	135	488	272	155	96	239	152
6	45	76	100	87	73	124	565	254	152	92	224	142
7	46	75	93	96	71	119	511	256	148	90	212	130
8	46	74	96	105	71	126	427	278	143	118	197	127
9	46	71	92	104	e71	173	387	265	135	89	186	156
10	46	68	92	100	72	486	364	243	132	87	175	123
11	45	61	92	89	e72	1450	351	232	129	82	168	115
12	43	52	92	86	e71	1470	336	223	129	151	191	111
13	43	60	89	78	e71	753	320	214	122	162	168	109
14	44	54	88	76	e71	440	309	212	119	264	195	109
15	63	86	84	76	e71	356	293	203	150	251	183	105
16	43	160	67	75	e71	329	277	200	120	183	182	197
17	60	206	79	69	e71	356	267	193	114	257	160	134
18	50	224	79	66	91	326	308	195	115	545	149	120
19	50	169	76	66	80	294	317	192	112	499	155	120
20	49	150	68	66	82	315	309	181	113	614	225	112
21	47	125	68	71	88	512	295	175	136	622	214	109
22	79	133	68	83	87	2540	283	170	115	735	190	118
23	132	123	68	74	e85	1980	265	168	116	626	173	117
24	99	111	62	76	e95	1220	252	208	117	499	165	111
25	92	74	65	69	95	787	241	194	110	919	156	111
26	82	89	63	70	108	664	227	193	111	1160	148	108
27	73	88	60	71	104	1240	219	186	106	814	139	107
28	71	90	60	69	99	1530	216	182	111	748	131	119
29	98	111	60	69	---	1120	210	188	135	571	126	101
30	84	123	60	69	---	837	261	182	128	447	275	95
31	83	---	60	70	---	684	---	173	---	387	258	---
TOTAL	1901	3031	2511	2465	2226	20878	10515	6743	3915	11559	6177	3918
MEAN	61.3	101	81.0	79.5	79.5	673	351	218	131	373	199	131
MAX	132	224	116	144	108	2540	610	288	167	1160	341	231
MIN	43	52	60	60	70	115	210	168	106	82	126	95
AC-FT	3770	6010	4980	4890	4420	41410	20860	13370	7770	22930	12250	7770
CFSM	.20	.33	.27	.26	.26	2.22	1.16	.72	.43	1.23	.66	.43

e Estimated

ZUMBRO RIVER BASIN

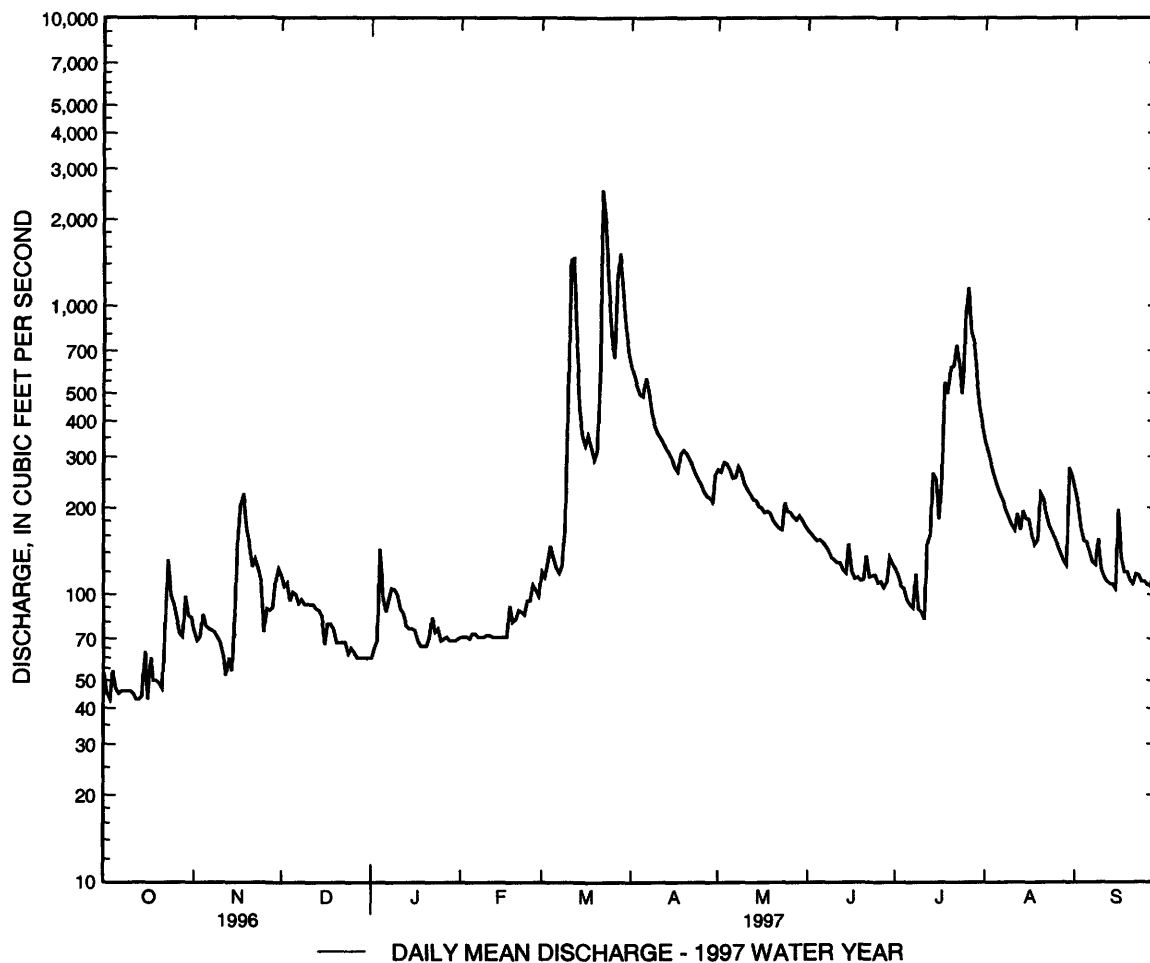
05372995 SOUTH FORK ZUMBRO RIVER AT ROCHESTER, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1981 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	164	152	125	79.8	124	408	404	305	235	230	164	183
MAX	824	338	358	167	454	760	1211	617	1014	663	501	1075
(WY)	1987	1992	1992	1983	1984	1983	1993	1991	1993	1993	1990	1986
MIN	20.0	24.5	21.0	22.5	23.8	165	106	88.3	49.0	23.2	24.6	31.5
(WY)	1990	1990	1990	1990	1990	1987	1981	1989	1989	1988	1988	1988

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1981 - 1997	
ANNUAL TOTAL	61682		75839		216	
ANNUAL MEAN	169		208		431	
HIGHEST ANNUAL MEAN					87.3	
LOWEST ANNUAL MEAN					216	
HIGHEST DAILY MEAN	2890		Mar 25		7710	
LOWEST DAILY MEAN	43		Oct 3		12	
ANNUAL SEVEN-DAY MINIMUM	45		Oct 8		14	
INSTANTANEOUS PEAK FLOW			3000		Mar 22	
INSTANTANEOUS PEAK STAGE			9.25		Mar 22	
INSTANTANEOUS LOW FLOW			39 ^a		Oct 15	
ANNUAL RUNOFF (AC-FT)	122300		150400		156300	
ANNUAL RUNOFF (CFSM)	.56		.69		.71	
10 PERCENT EXCEEDS	303		432		478	
50 PERCENT EXCEEDS	92		120		120	
90 PERCENT EXCEEDS	49		66		44	

a Due in part to regulation.



WHITEWATER RIVER BASIN

05376800 WHITEWATER RIVER NEAR BEAVER, MN

LOCATION.--Lat 44° 00' 19", long 92° 00' 19", in SW 1/4 SE 1/4 sec. 15, T. 108 N., R. 10 W., Winona County, Hydrologic Unit 07040003, on left bank at downstream side of bridge on County Road No. 30, 0.5 mi above mouth of Beaver Creek, and 4.7 mi north of Elba.

DRAINAGE AREA.--271 mi².

PERIOD OF RECORD.--May 1975 to September 1985, May 1991 to July 1993, October 1993 to current.

GAGE.--Water-stage recorder. Datum of gage is 692.01 ft above mean sea level. Prior to Oct. 1, 1976, at datum 2.00 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge since at least 1939, 19,200 ft³/s, June 21, 1974, gage height, 13.00 ft, present datum, determined by contracted opening measurement.

EXTREMES FOR CURRENT RECORD.--Peak discharge greater than base discharge of 2,000 ft³/s and maximum (*).

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (f')					
Mar. 22	2300	*1420	*4.90	(No peak greater than base discharge.)								
DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997												
DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	119	133	146	e110	e107	111	364	202	147	130	177	e200
2	114	131	138	e120	e110	111	346	193	144	128	169	e210
3	111	129	136	e124	112	112	324	195	143	127	196	e190
4	117	133	131	e136	119	120	304	189	143	129	189	e173
5	117	136	136	e140	115	116	292	183	147	126	162	e162
6	114	134	135	e123	113	111	290	175	152	124	155	e156
7	114	133	130	e128	112	109	256	174	149	122	152	e140
8	114	130	130	e125	111	110	240	192	145	128	149	e130
9	122	129	127	e122	108	115	232	185	141	126	147	e162
10	120	127	128	e120	112	184	226	173	139	123	145	e138
11	120	125	128	e118	110	493	222	171	138	120	143	e125
12	121	123	128	e117	107	490	217	168	138	125	150	e115
13	121	124	127	e116	104	296	210	165	137	125	151	e108
14	e109	121	127	e115	112	193	201	167	134	140	152	e106
15	e106	131	e131	e114	105	183	196	165	138	138	159	e105
16	e112	176	e124	e113	108	178	191	160	140	127	161	e104
17	e122	247	e125	e112	106	173	186	158	136	135	e160	e190
18	124	214	e116	e111	109	161	191	158	134	141	e150	e150
19	123	169	e116	e111	110	154	215	158	134	168	e157	e130
20	122	159	e110	e111	109	159	208	154	135	157	e209	e123
21	122	153	e107	e119	110	181	194	151	139	150	e200	e121
22	130	148	e107	e120	109	1190	187	150	136	147	e182	e132
23	156	148	e108	120	106	929	181	149	133	145	e167	e126
24	153	145	e110	123	101	562	174	157	132	142	e157	e122
25	144	131	e105	111	107	375	169	168	131	386	e150	e119
26	136	e120	e103	e110	110	349	165	155	127	489	e140	e117
27	131	e125	e100	e107	109	771	165	150	124	307	e135	e116
28	128	e130	e98	e104	108	884	167	149	126	254	e130	e118
29	137	139	e97	e100	---	608	164	153	145	224	e125	e118
30	142	147	e100	e100	---	461	176	153	141	201	e235	e110
31	138	---	e104	e104	---	394	---	149	---	185	e220	---
TOTAL	3859	4290	3708	3604	3059	10383	6653	5169	4148	5269	5074	4116
MEAN	124	143	120	116	109	335	222	167	138	170	164	137
MAX	156	247	146	140	119	1190	364	202	152	489	235	210
MIN	106	120	97	100	101	109	164	149	124	120	125	104
AC-FT	7650	8510	7350	7150	6070	20590	13200	10250	8230	10450	10060	8160
CFM	.46	.53	.44	.43	.40	1.24	.82	.62	.51	.63	.60	.51
IN.	.53	.59	.51	.49	.42	1.43	.91	.71	.57	.72	.70	.57

e Estimated

WHITEWATER RIVER BASIN

05376800 WHITEWATER RIVER NEAR BEAVER, MN--Continued

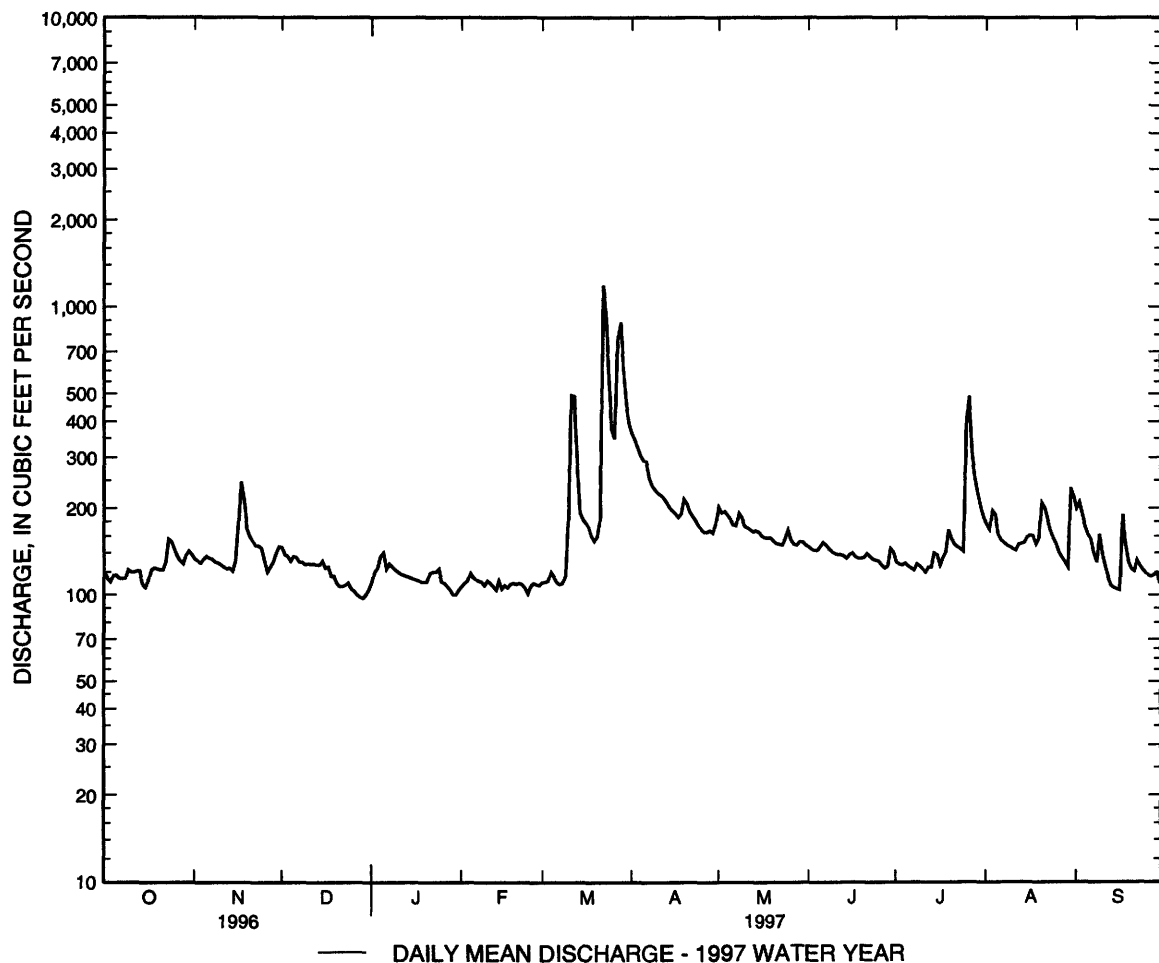
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	141	155	139	125	147	278	202	180	173	218	148	142
MAX	223	288	235	188	236	512	282	255	240	973	205	230
(WY)	1994	1992	1992	1980	1985	1985	1992	1984	1980	1978	1979	1978
MIN	88.0	84.8	77.0	80.6	59.7	84.2	92.9	89.6	112	92.1	87.1	85.5
(WY)	1978	1978	1977	1978	1978	1978	1977	1977	1976	1977	1977	1977

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1975 - 1997
ANNUAL TOTAL	64056	59332	
ANNUAL MEAN	175	163	168 ^a
HIGHEST ANNUAL MEAN			203
LOWEST ANNUAL MEAN			103
HIGHEST DAILY MEAN	3030	Mar 25	1190
LOWEST DAILY MEAN	97	Dec 29	97
ANNUAL SEVEN-DAY MINIMUM	101	Dec 25	101
INSTANTANEOUS PEAK FLOW			1420
INSTANTANEOUS PEAK STAGE			4.90
INSTANTANEOUS LOW FLOW			77 ^b
ANNUAL RUNOFF (AC-FT)	127100	117700	121600
ANNUAL RUNOFF (CFSM)	.65	.60	.62
ANNUAL RUNOFF (INCHES)	8.79	8.14	8.42
10 PERCENT EXCEEDS	232	210	236
50 PERCENT EXCEEDS	140	136	143
90 PERCENT EXCEEDS	111	109	94

 a Median of annual mean discharges is 172 ft³/s.

b Minimum recorded, result of freezeup.



UPPER MISSISSIPPI RIVER BASIN

05378500 MISSISSIPPI RIVER AT WINONA, MN

LOCATION.--Lat 44°03'21", long 91°38'16", in sec. 23, T.107 N., R.7 W., Winona County, Hydrologic Unit 07040003, on right bank at Winona pumping station in Winona, 9.5 mi upstream from Trempealeau River, and at mile 725.7 upstream from the Ohio River.

DRAINAGE AREA.--59,200 mi², approximately.

PERIOD OF RECORD.--June 1928 to current year. Gage-height records collected in this vicinity since 1878 are contained in reports of Mississippi River Commission.

GAGE.--Water-stage recorder. Datum of gage is 639.64 ft above mean sea level. June 10, 1928 to Apr. 15, 1931, nonrecording gage at site 800 ft upstream. Prior to Oct. 1, 1929, at datum 0.20 ft higher and Oct. 1, 1929 to Apr. 15, 1931, at datum 0.12 ft lower. Apr. 16, 1931 to Nov. 12, 1934, nonrecording gage at present site and datum. Since Mar. 31, 1937, auxiliary water-stage recorder 2.7 mi upstream at tailwater of navigation dam 5A.

REMARKS.--Records good except those for estimated days, which are fair to poor. Some regulation by reservoirs, navigation dams, and power plants at low and medium stages. Daily discharges for some days provided by the U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Minimum gage height, -3.38 ft, Aug. 31, 1934 (prior to dam construction in 1936); minimum gage height since 1938, after completion of dam, 1.95 ft, Jan. 27, 1944.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 18, 1880, reached an elevation of 657.14 ft, discharge, 172,000 ft³/s, from information by U.S. Army Corps of Engineers.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19500	36500	45500	e25000	e27000	e27700	74400	90900	42800	34800	66100	e42000
2	17600	37100	56400	e25100	e27000	e29700	80000	85900	42900	35600	64700	e43000
3	19200	38100	63600	e26800	e27400	31400	88000	83000	42800	40000	63900	e42000
4	19700	39000	62800	e27800	e28300	29800	97900	79200	42300	45100	62100	e41000
5	19700	40300	62600	e31500	e29200	28700	112000	76700	39800	49500	59800	e40000
6	17800	41000	62000	e32800	e29100	28600	130000	75300	39200	51400	58700	e39000
7	16400	39800	62900	e27700	e29000	28700	147000	72800	37700	51500	56000	e37000
8	15600	38800	62400	e25800	e27400	28900	161000	70500	36300	51300	52000	e35000
9	15300	37600	56100	e27000	e27300	29400	173000	69100	35500	52200	48700	e33000
10	16400	35800	41700	e29200	e27000	28500	184000	66100	34200	52900	44900	e31000
11	16100	35700	39000	e31600	e27000	28200	192000	64200	32500	52600	40100	e30000
12	15100	35800	37700	e30000	e27000	28400	194000	63700	31400	52800	37600	e29000
13	15200	34700	36800	e26900	e26900	31800	193000	62100	29900	52700	37200	e28000
14	15800	33400	36900	e26400	e26700	32500	190000	59700	29000	53200	32800	e27000
15	15100	31400	36600	e26500	e26600	34000	187000	59300	27300	53100	32000	e26000
16	15500	30400	33000	e27800	e26700	38000	183000	58000	24300	52900	31800	e25000
17	15100	33900	30300	e27300	e26700	38600	178000	56200	21200	54000	32300	e27000
18	16400	40600	27100	e21600	e26700	36800	171000	55400	23500	55500	31300	e32000
19	22500	46400	21000	e23300	e27300	35500	164000	55100	27400	57500	29900	e37000
20	25600	52100	e22000	e26400	e27600	36700	156000	52700	27400	58100	31200	e36000
21	27000	58700	e24000	e28400	e28000	37400	148000	48800	27000	57400	35800	e36000
22	27800	62200	e26000	e28800	e28200	39100	141000	50600	26900	57100	39100	e35000
23	28800	62500	e33200	e28700	e28300	43800	133000	48000	26200	56500	40900	e32000
24	28900	55400	e33200	e28600	e28600	49900	127000	46600	23500	58000	41000	e30000
25	30200	54700	e33000	e28400	e28200	53900	120000	46600	20800	61900	41800	e28000
26	32500	43300	e30900	e28300	e26700	55400	113000	45000	19500	63500	41500	e28000
27	33200	39000	e26200	e25700	e27000	58200	108000	41900	20600	64200	e41000	e27000
28	34500	38700	e25200	e25700	e27500	60500	103000	42500	27600	68200	e40000	e27000
29	35200	37500	e25000	e25700	---	64300	97500	42900	31200	70000	e38000	e28000
30	35200	42200	e25000	e25800	---	68400	94600	42900	34300	68600	e39000	e28000
31	36000	---	e25000	e25800	---	72300	---	42900	---	67100	e40000	---
TOTAL	698900	1252600	1203100	846400	770400	1235100	4240400	1854600	925000	1699200	1351200	979000
MEAN	22550	41750	38810	27300	27510	39840	141300	59830	30830	54810	43590	32630
MAX	36000	62500	63600	32800	29200	72300	194000	90900	42900	70000	66100	43000
MIN	15100	30400	21000	21600	26600	27700	74400	41900	19500	34800	29900	25000
AC-FT	1386000	2485000	2386000	1679000	1528000	2450000	8411000	3679000	1835000	3370000	2680000	1942000
CFSM	.38	.71	.66	.46	.46	.67	2.39	1.01	.52	.93	.74	.55

e Estimated

UPPER MISSISSIPPI RIVER BASIN

05378500 MISSISSIPPI RIVER AT WINONA, MN--Continued

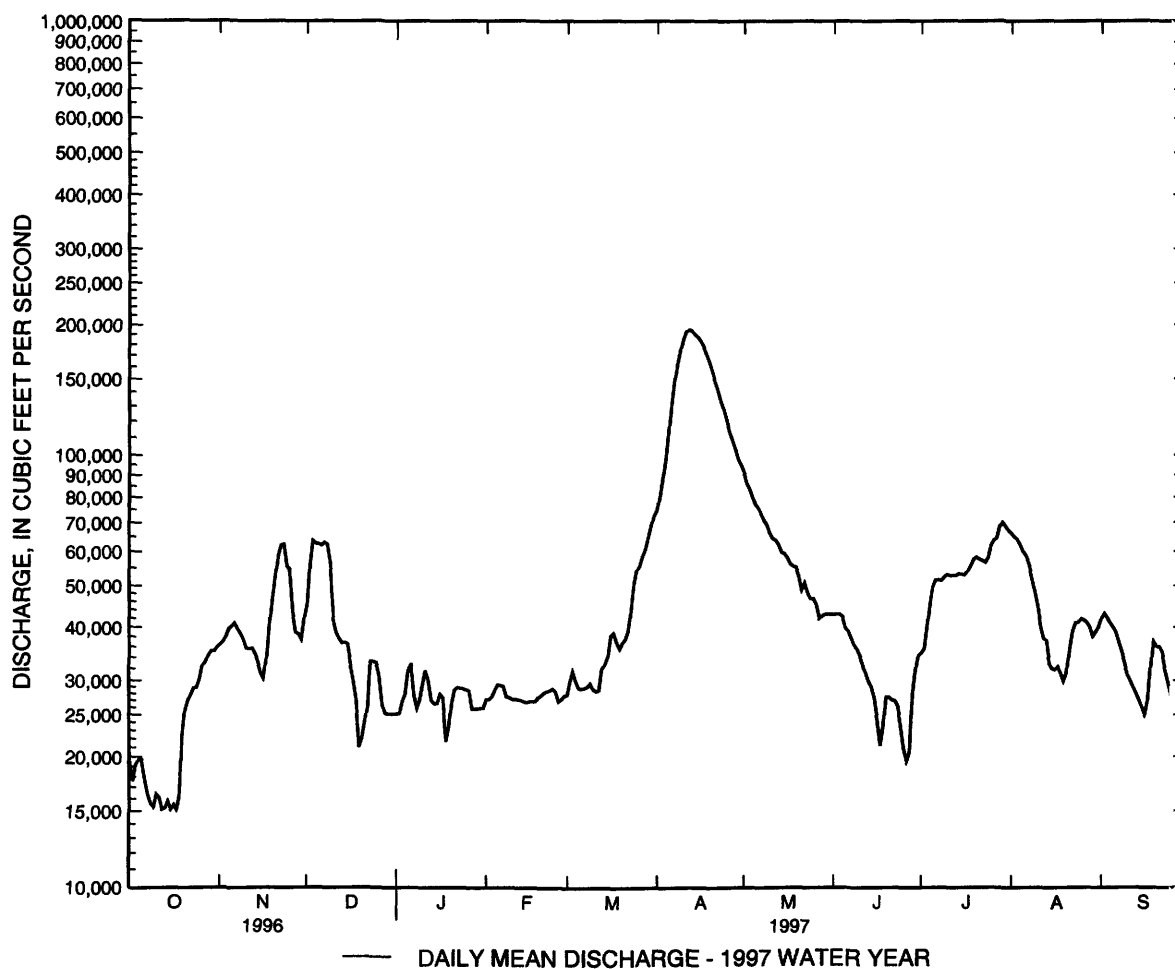
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1928 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	22610	22960	17710	15230	15410	30460	61430	48710	39170	31600	21440	22540
MAX	85950	50040	40440	30480	35900	86420	152600	111500	100200	118800	67560	69490
(WY)	1987	1972	1992	1983	1984	1983	1965	1986	1993	1993	1993	1986
MIN	6774	7367	6286	6742	7874	9023	12810	11930	8450	7063	5391	6790
(WY)	1934	1934	1934	1940	1977	1934	1931	1931	1934	1934	1934	1933

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	FOR 1997 WATER YEAR	FOR 1997 WATER YEAR
ANNUAL TOTAL	15263500	17055900		
ANNUAL MEAN	41710	46730	29140	
HIGHEST ANNUAL MEAN			56850	1986
LOWEST ANNUAL MEAN				1934
HIGHEST DAILY MEAN	143000	Apr 25	194000	Apr 12
LOWEST DAILY MEAN	14800	Sep 17	15100	Oct 12
ANNUAL SEVEN-DAY MINIMUM	15400	Oct 11	15400	Oct 11
INSTANTANEOUS PEAK FLOW			194000	Apr 11
INSTANTANEOUS PEAK STAGE			18.27	Apr 11
INSTANTANEOUS LOW FLOW				1940 ^b
ANNUAL RUNOFF (AC-FT)	30280000	33830000	21110000	
ANNUAL RUNOFF (CFSM)	.70	.79	.49	
10 PERCENT EXCEEDS	69500	73400	60400	
50 PERCENT EXCEEDS	34400	36000	20900	
90 PERCENT EXCEEDS	18100	25100	9900	

a From highwater mark.

b Result of ice jam.



UPPER MISSISSIPPI RIVER BASIN
05378500 MISSISSIPPI RIVER AT WINONA, MN--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.-- Daily sediment, temperature, and specific conductance station, water years 1976 to 88. Periodic sediment station, water years 1989 to current.

REMARKS.-- Suspended-sediment samples were collected at five points in a river cross-section.

SUSPENDED-SEDIMENT CONCENTRATIONS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT SUS- SPENDED MG/L (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR 17...	1610	177,000	70	61
MAY 08...	1600	70,400	21	83

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ROOT RIVER BASIN

05385000 ROOT RIVER NEAR HOUSTON, MN

LOCATION.--43°46'07", long 91°34'11", in SW¼NW¼ sec. 33, T.104 N., R.6 W., Houston County, Hydrologic Unit 07040008, on right bank 0.2 mi north of Houston and 1.6 mi upstream from South Fork and 18.2 mi upstream from mouth.

DRAINAGE AREA.--1,270 mi², approximately.

PERIOD OF RECORD.--May 1909 to September 1917, May to November 1929, March 1930 to 1983, 1991 to current year. Operated as high-flow partial-record station October 1983 to September 1990. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 895: Drainage area. WSP 1508: 1911-12. WSP 1628: 1948(P).

GAGE.--Water-stage recorder. Datum of gage is 667.00 ft above mean sea level. May 28, 1909 to Sept. 30, 1917, nonrecording gage at site 1.3 mi downstream at different datum. May 4, 1929 to Sept. 27, 1933, nonrecording gage and Sept. 28, 1933 to June 26, 1980, recording gage at site 0.9 mi upstream at datum 671.86 ft.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Slight diurnal fluctuation at low flows caused by power plants above station.

EXTREME FOR CURRENT YEAR.--Peak discharges above base of 5,000 ft³/s and maximum (*).

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 23	2100	7100	11.78	Mar. 29	0300	*7750	*12.24

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	420	423	504	e450	e450	e535	2650	974	784	1130	1430	995
2	419	417	459	e460	e445	e530	2390	1040	758	981	1290	999
3	417	403	490	e460	e430	e520	2240	1110	737	861	1220	897
4	405	398	e520	e450	e450	e520	2070	1170	726	796	1140	828
5	399	400	e550	e450	e460	e525	1930	1240	727	749	1020	792
6	403	401	e560	e450	e460	e530	1860	1200	753	713	951	781
7	408	403	e560	e450	e460	536	1900	1140	747	674	899	753
8	407	398	e555	e455	e445	539	1770	1140	729	668	856	727
9	406	393	e555	e450	e440	617	1530	1120	706	668	818	773
10	404	386	e545	e435	e450	1000	1400	1070	688	639	788	720
11	401	382	e540	e430	e445	2240	1320	1030	675	625	760	689
12	401	361	e530	e430	e430	4170	1260	992	664	620	753	670
13	399	358	520	e435	e430	4300	1190	953	656	651	752	658
14	401	347	520	e430	e430	2650	1140	924	641	719	736	648
15	399	391	517	e435	e430	1690	1090	901	641	743	831	638
16	397	608	474	e450	e460	1440	1050	873	644	854	836	648
17	399	701	465	e450	e510	1370	1020	851	629	882	801	693
18	399	700	455	e430	e531	1280	998	837	616	853	760	676
19	393	696	e460	e430	e540	1170	1020	830	605	1220	735	658
20	390	639	e460	e430	e530	1080	1040	810	606	1440	759	637
21	390	587	e450	e457	e518	1200	1020	785	638	1440	796	617
22	402	539	e450	e460	e502	3600	986	757	633	1330	818	611
23	481	524	e450	e460	e510	6430	959	745	612	1610	811	632
24	485	513	e440	e460	e520	6010	928	748	634	1450	924	630
25	467	457	e430	e450	e540	3960	904	810	714	2160	794	624
26	449	383	e430	e450	e550	2810	875	823	762	2840	757	611
27	429	e420	e430	e450	e550	3690	850	824	717	2380	737	605
28	413	e500	e420	e440	e540	6530	836	807	681	2270	715	599
29	416	e580	e415	e440	---	6370	835	801	694	2210	697	593
30	450	e530	e425	e445	---	3910	856	810	790	2040	740	584
31	437	---	e435	e450	---	3110	---	802	---	1630	873	---
TOTAL	12886	14238	15014	13822	13456	74862	39917	28917	20607	37846	26797	20986
MEAN	416	475	484	446	481	2415	1331	933	687	1221	864	700
MAX	485	701	560	460	550	6530	2650	1240	790	2840	1430	999
MIN	390	347	415	430	430	520	835	745	605	620	697	584
AC-FT	25560	28240	29780	27420	26690	148500	79180	57360	40870	75070	53150	41630
CFSM	.33	.37	.38	.35	.38	1.90	1.05	.73	.54	.96	.68	.55
IN.	.38	.42	.44	.40	.39	2.19	1.17	.85	.60	1.11	.78	.61

e Estimated

ROOT RIVER BASIN

05385000 ROOT RIVER NEAR HOUSTON, MN--Continued

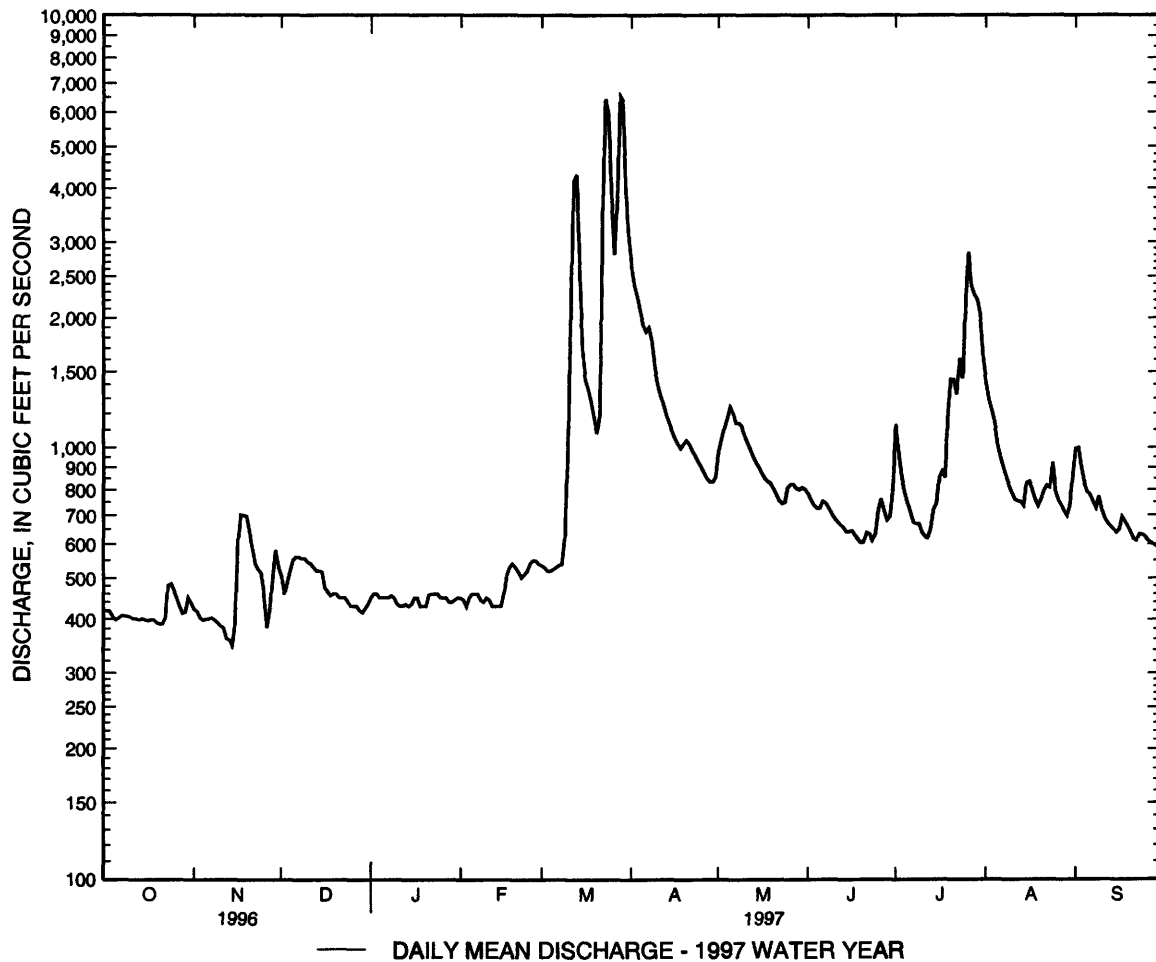
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1910 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	512	512	430	409	483	1415	1187	822	886	783	641	567
MAX	1465	1494	1671	1152	1427	3512	4963	2440	2803	3252	2257	2105
(WY)	1974	1983	1992	1973	1966	1961	1965	1973	1974	1978	1993	1938
MIN	193	218	189	172	168	251	274	234	261	236	231	243
(WY)	1934	1934	1934	1959	1959	1931	1931	1934	1934	1964	1958	1933

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1910 - 1997
ANNUAL TOTAL	261232	319348	
ANNUAL MEAN	714	875	727
HIGHEST ANNUAL MEAN			1590
LOWEST ANNUAL MEAN			294
HIGHEST DAILY MEAN	6310	Mar 25	6530
LOWEST DAILY MEAN	347	Nov 14	347
ANNUAL SEVEN-DAY MINIMUM	374	Nov 9	374
INSTANTANEOUS PEAK FLOW			7750
INSTANTANEOUS PEAK STAGE			12.24
INSTANTANEOUS LOW FLOW			331
ANNUAL RUNOFF (AC-FT)	518200	633400	526300
ANNUAL RUNOFF (CFSM)	.56	.69	.57
ANNUAL RUNOFF (INCHES)	7.65	9.35	7.77
10 PERCENT EXCEEDS	1120	1430	1280
50 PERCENT EXCEEDS	546	644	460
90 PERCENT EXCEEDS	403	417	262

a Backwater from ice.

b Also occurred Feb. 25, 1935.



IOWA RIVER BASIN

05457000 CEDAR RIVER NEAR AUSTIN, MN

LOCATION.--Lat 43°38'11", long 92°58'26", in NE¼SE¼ sec. 15, T.102 N., R.18 W., Mower County, Hydrologic Unit 07080201, on left bank 200 ft upstream from abandoned powerhouse, 500 ft downstream from highway bridge, 1.1 mi downstream from Turtle Creek, and 1.1 mi south of Austin.

DRAINAGE AREA.--425 mi².

PERIOD OF RECORD.--May 1909 to September 1914, October 1944 to current year.

REVISED RECORDS.--WSP 1145: 1945, 1948.

GAGE.--Water-stage recorder. Datum of gage is 1,162.10 ft above mean sea level. May 1909 to April 1912, nonrecording gage in tailwater of power plant 200 ft downstream at datum 3.1 ft lower. May 1912 to September 1914, nonrecording gage on highway bridge 500 ft downstream at datum 1.1 ft lower.

REMARKS.--Records good except those for estimated daily discharges, which are fair.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Mar. 12	--	4060	10.62a	Mar. 28	0830	2590	8.21
Mar. 23	0200	*4960	*12.01				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64	102	254	e122	118	145	813	324	350	271	342	198
2	65	87	262	126	99	163	748	344	325	237	301	180
3	57	93	233	124	e100	191	667	461	303	206	263	154
4	58	105	215	176	e98	200	618	475	285	185	232	136
5	60	107	205	142	95	191	641	433	302	174	204	143
6	60	111	198	119	94	173	1050	373	325	158	196	136
7	61	112	183	e128	94	172	995	359	280	144	180	133
8	59	115	163	e137	91	162	742	415	257	194	166	131
9	67	107	164	e138	90	301	576	416	236	183	150	126
10	60	92	174	e132	92	1310	524	370	218	155	144	118
11	60	87	168	e128	94	e2990	476	351	206	136	135	111
12	61	85	167	e122	96	e3400	444	329	197	138	167	104
13	60	93	170	e120	e92	1950	415	298	187	336	148	100
14	58	81	160	e116	90	1020	381	293	172	922	139	98
15	61	92	125	e109	92	758	365	274	170	917	176	98
16	60	213	144	e109	90	642	346	252	168	570	235	105
17	70	661	e143	e107	99	517	318	242	155	524	211	103
18	71	707	e140	e100	104	470	321	252	155	640	188	95
19	66	473	e133	e100	104	441	362	250	146	769	176	99
20	62	344	e130	e101	110	605	365	229	154	616	186	95
21	68	284	e130	e106	117	1710	352	219	171	553	194	89
22	86	261	e129	e111	119	4260	332	213	155	831	187	102
23	126	246	e126	e113	115	4100	308	212	242	1550	195	119
24	125	214	e123	e111	124	2580	290	302	363	1170	184	116
25	121	179	e123	e108	123	1510	272	563	316	880	175	114
26	105	e168	e122	e108	121	1160	253	518	255	1110	168	109
27	95	e182	e121	e109	121	1920	245	432	224	1210	154	107
28	86	175	e120	e108	122	2440	242	382	203	904	145	118
29	106	186	e120	e106	---	1740	235	392	303	641	134	106
30	114	227	e119	e109	---	1230	274	414	329	494	168	99
31	106	---	e119	e115	---	950	---	382	---	398	195	---
TOTAL	2378	5989	4883	3660	2904	39401	13970	10769	7152	17216	5838	3542
MEAN	76.7	200	158	118	104	1271	466	347	238	555	188	118
MAX	126	707	262	176	124	4260	1050	563	363	1550	342	198
MIN	57	81	119	100	90	145	235	212	146	136	134	89
AC-FT	4720	11880	9690	7260	5760	78150	27710	21360	14190	34150	11580	7030
CFSM	.18	.47	.37	.28	.24	2.99	1.10	.82	.56	1.31	.44	.28
IN.	.21	.52	.43	.32	.25	3.45	1.22	.94	.63	1.51	.51	.31

a From highwater mark.

e Estimated

IOWA RIVER BASIN

05457000 CEDAR RIVER NEAR AUSTIN, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1997, BY WATER YEAR (WY)

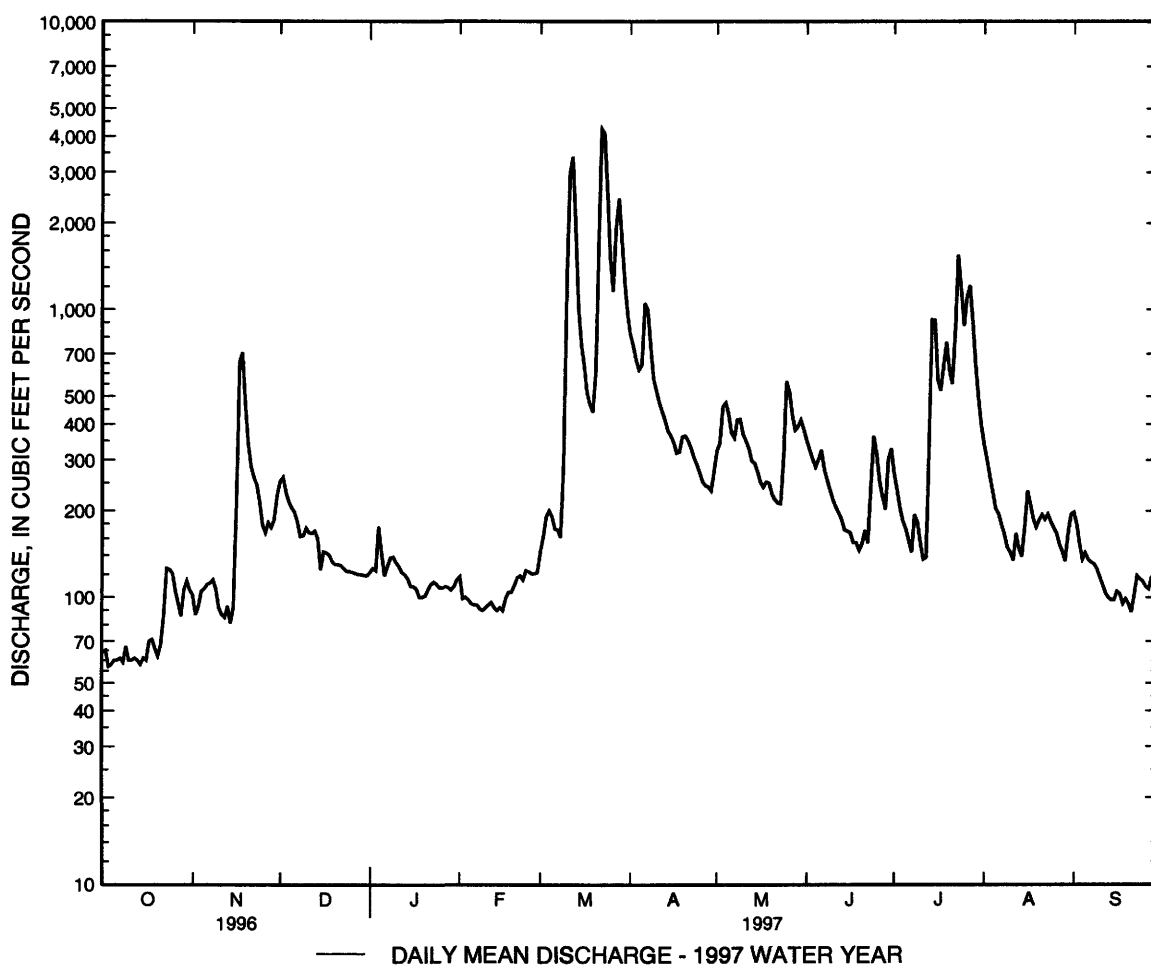
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	164	160	107	75.0	104	487	509	300	284	250	184	149
MAX	884	997	431	261	701	1428	2011	1222	1624	1456	1720	734
(WY)	1974	1910	1992	1973	1984	1973	1993	1991	1993	1978	1993	1993
MIN	37.3	35.7	26.6	26.5	25.0	53.3	52.9	67.9	48.9	22.6	32.3	37.9
(WY)	1959	1959	1913	1913	1913	1968	1911	1910	1950	1911	1948	1911

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1909 - 1997	
ANNUAL TOTAL	83109		117702			
ANNUAL MEAN	227		322		232 ^a	
HIGHEST ANNUAL MEAN					824	
LOWEST ANNUAL MEAN					58.1	
HIGHEST DAILY MEAN	2400		4260		8720	
LOWEST DAILY MEAN	57		57		.00 ^b	
ANNUAL SEVEN-DAY MINIMUM	59		60		13	
INSTANTANEOUS PEAK FLOW			4960		12400	
INSTANTANEOUS PEAK STAGE			12.01		20.35 ^c	
INSTANTANEOUS LOW FLOW			55		.00	
ANNUAL RUNOFF (AC-FT)	164800		233500		167800	
ANNUAL RUNOFF (CFSM)	.53		.76		.54	
ANNUAL RUNOFF (INCHES)	7.27		10.30		7.40	
10 PERCENT EXCEEDS	468		641		480	
50 PERCENT EXCEEDS	133		170		94	
90 PERCENT EXCEEDS	64		92		44	

a Median of annual mean discharges is 220 ft³/s.

b Occurred on several days in 1911, result of regulation.

c From floodmark.



DES MOINES RIVER BASIN

05476000 DES MOINES RIVER AT JACKSON, MN

LOCATION.--Lat 43°37'10", long 94°59'10", in SE 1/4 SW 1/4 sec. 24, T.102 N., R.35 W., Jackson County, Hydrologic Unit 07100001, on right bank in storage room of city power plant in Jackson.

DRAINAGE AREA.--1,220 mi², approximately.

PERIOD OF RECORD.--May 1909 to December 1913, August 1930 to current year (winter record incomplete prior to 1936). Published as Des Moines River near Jackson, 1930-35, as West Fork Des Moines River near Jackson, 1936-44, and as West Fork Des Moines River at Jackson, 1945-69.

REVISED RECORDS.--WSP 1115: 1942. WSP 1175: Drainage area. WSP 1238: 1950. WSP 1308: 1938(M).

GAGE.--Water-stage recorder. Datum of gage is 1,287.75 ft above mean sea level. May 31, 1909 to Dec. 20, 1913, nonrecording gage at site 0.6 mi downstream at datum 0.99 ft lower. Aug. 22, 1930 to Sept. 30, 1944, nonrecording gage at site 7 mi upstream at datum 17.10 ft higher. Oct. 1, 1944 to Oct. 26, 1949, nonrecording gage at site 600 ft upstream at datum 10.64 ft higher. Oct. 27, 1949 to Dec. 15, 1965, water-stage recorder 200 ft downstream at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Regulation at times from Yankton, Long, Shetek, and Heron Lakes.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 900 ft³/s and maximum (*)

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Mar. 31	0100	*5610	*14.63	May 24	0900	1050	7.0 ^e
Apr. 11	1800	5540	14.57	July 01	2100	1880	8.57

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	108	145	679	e185	e112	e136	5230	1390	821	2290	699	134
2	117	177	645	e190	e110	e135	5200	1430	798	2200	642	132
3	89	260	653	e200	e110	e134	5320	1540	759	2140	605	121
4	88	320	575	e210	e110	e133	5190	1580	735	2120	588	101
5	78	290	606	e210	e110	e132	5130	1590	714	2100	566	91
6	62	292	604	e200	e110	e130	5270	1540	680	2090	548	88
7	62	283	622	e187	e110	e130	5280	1560	650	2020	525	82
8	68	276	554	e192	e110	e140	5050	1610	628	1980	480	78
9	76	266	548	e187	e110	e160	4640	1580	602	2020	447	76
10	64	241	537	e175	e110	e175	5090	1420	573	1900	421	76
11	60	129	549	e158	e110	e200	5440	1370	555	1720	386	73
12	61	110	535	e160	e110	e250	5280	1310	531	1570	379	65
13	56	174	558	e165	e110	e310	4770	1240	510	1460	368	65
14	48	178	582	e162	e110	e340	4100	1210	476	1400	345	64
15	44	330	446	e150	e110	e350	3640	1130	461	1390	348	60
16	46	523	330	e130	e110	e360	3370	1070	444	1300	320	68
17	125	775	e320	e115	e110	e390	3150	1040	375	1290	294	78
18	205	822	e305	e109	e112	e470	2990	956	375	1230	273	71
19	219	801	e280	e108	e125	e580	2840	925	359	1130	264	75
20	186	805	e270	e109	e139	e1000	2710	855	380	1030	316	54
21	185	803	e275	e110	e150	1650	2590	820	390	943	277	45
22	185	793	e280	e112	e148	1950	2450	793	426	894	239	50
23	189	748	e210	e115	e142	2190	2310	769	660	917	231	57
24	180	623	e180	e116	e141	2350	2180	976	1010	927	224	64
25	173	564	e160	e110	e140	2490	2050	1000	1120	933	203	67
26	169	571	e165	e109	e138	3020	1920	969	1290	877	198	65
27	171	743	e165	e107	e137	3890	1820	947	1340	879	190	61
28	173	744	e165	e105	e137	4410	1680	931	1340	853	177	51
29	151	707	e170	e104	---	4890	1570	922	1320	830	160	49
30	156	691	e175	e109	---	5170	1480	894	1820	807	166	51
31	186	---	e180	e113	---	5450	---	862	---	757	158	---
TOTAL	3780	14184	12323	4512	3381	43115	109740	36229	22142	43997	11037	2212
MEAN	122	473	398	146	121	1391	3658	1169	738	1419	356	73.7
MAX	219	822	679	210	150	5450	5440	1610	1820	2290	699	134
MIN	44	110	160	104	110	130	1480	769	359	757	158	45
AC-FT	7500	28130	24440	8950	6710	85520	217700	71860	43920	87270	21890	4390
CFSM	.10	.39	.33	.12	.10	1.14	3.00	.96	.60	1.16	.25	.06
IN.	.12	.43	.38	.14	.10	1.31	3.35	1.10	.68	1.34	.34	.07

e Estimated

DES MOINES RIVER BASIN

05476000 DES MOINES RIVER AT JACKSON, MN--Continued

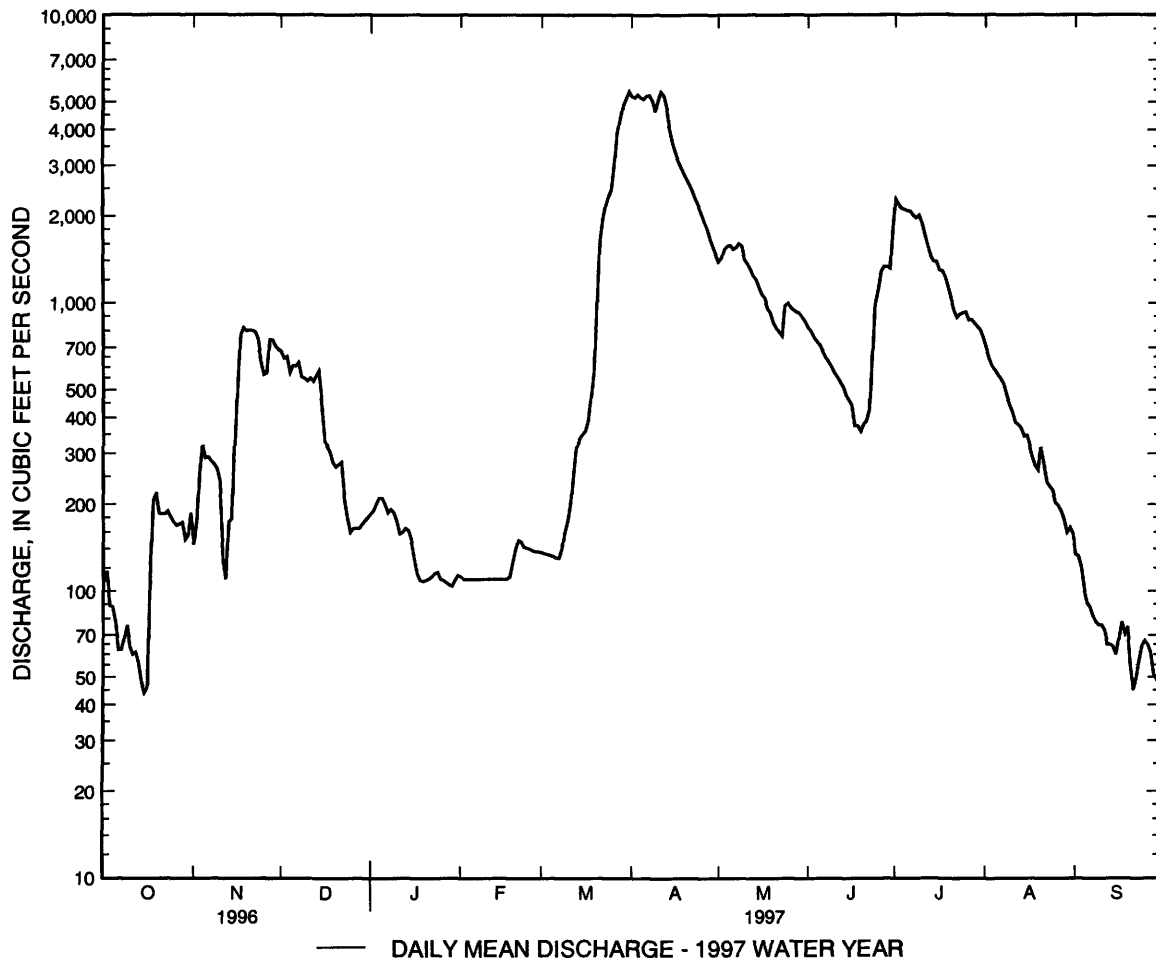
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	170	180	105	49.3	67.6	471	1070	649	633	549	234	181
MAX	1724	1833	792	298	504	2250	6045	3923	4892	6018	2192	2243
(WY)	1987	1980	1980	1980	1983	1983	1969	1993	1993	1993	1993	1942
MIN	.000	.000	.000	.000	.000	11.8	9.37	2.59	3.76	1.04	.13	.000
(WY)	1956	1956	1956	1956	1936	1959	1959	1934	1931	1931	1955	1931

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR	FOR 1997 WATER YEAR	WATER YEARS 1930 - 1997
ANNUAL TOTAL	207163	306652	
ANNUAL MEAN	566	840	385
HIGHEST ANNUAL MEAN			2098 ^a
LOWEST ANNUAL MEAN			15.1
HIGHEST DAILY MEAN	4010	Jun 24	5450
LOWEST DAILY MEAN	44	Oct 15	44
ANNUAL SEVEN-DAY MINIMUM	54	Oct 10	54
INSTANTANEOUS PEAK FLOW		5610	5610
INSTANTANEOUS PEAK STAGE		14.63	14.63
INSTANTANEOUS LOW FLOW		41	41
ANNUAL RUNOFF (AC-FT)	410900	608200	279100
ANNUAL RUNOFF (CFSM)	.46	.69	.32
ANNUAL RUNOFF (INCHES)	6.32	9.35	4.29
10 PERCENT EXCEEDS	1220	2130	1030
50 PERCENT EXCEEDS	320	348	87
90 PERCENT EXCEEDS	109	86	3.0

a Median of annual mean discharges is 257 ft³/s.

b Many days, several years.



BIG SIOUX RIVER BASIN

06483000 ROCK RIVER AT LUVERNE, MN

LOCATION.--Lat 43°39'15", long 96°12'03", in SW¼NE¼ sec. 11, T.102 N., R.45 W., Rock County, Hydrologic Unit 10170204, at bridge on Main Street (County Highway 4) in Luverne.

DRAINAGE AREA.--425 mi².

PERIOD OF RECORD.-- Sept. 1911 to Sept. 1914, non-recording gage at same site, monthly discharges only for same period published in WSP 1309. October 1972 to September 1995, annual maximums only. Daily-mean discharges, October 1995 to current.

GAGE.--Water-stage recorder. Datum of gage is 1,426.26 ft above mean sea level. Staff gage from 1911-14, crest-stage gage from 1975 to 1995.

REMARKS.--Records fair except those for estimated daily discharges, which are poor.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DAY	DAILY MEAN VALUES											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	113	306	e82	e54	e64	e65	2440	357	228	e1180	112	43
2	96	543	e80	e54	e61	e65	2540	411	206	e627	109	42
3	87	389	e80	e53	e59	e65	1880	717	194	462	97	41
4	82	196	e80	e52	e58	e65	1460	666	194	381	82	40
5	80	195	e80	e52	e58	e66	1900	514	193	327	85	39
6	77	193	e78	e52	e58	e67	8500	414	188	292	86	39
7	74	196	e75	e52	e59	e69	4180	477	181	267	91	34
8	71	188	e71	e52	e60	e72	1430	559	178	284	95	34
9	71	171	e69	e52	e60	e77	913	500	169	263	83	36
10	70	e150	e71	e53	e59	e82	813	419	161	225	79	38
11	69	e135	e73	e54	e59	e84	682	367	158	208	78	35
12	69	e130	e71	e52	e59	e86	625	325	168	190	77	34
13	71	e127	e69	e51	e60	e88	646	308	176	183	74	35
14	71	e111	e64	e50	e60	e92	694	288	171	223	71	34
15	67	e105	e61	e50	e60	e95	682	264	161	310	67	35
16	70	e98	e59	e50	e62	e97	612	257	154	215	64	36
17	119	e94	e58	e50	e64	e99	534	252	151	183	62	36
18	272	e90	e58	e51	e63	e102	491	275	151	152	60	38
19	306	e88	e59	e53	e62	e110	481	211	155	136	59	32
20	258	e86	e58	e55	e62	e200	463	231	173	131	65	30
21	219	e84	e57	e58	e62	e400	451	239	179	211	60	30
22	192	e82	e57	e55	e62	e800	462	224	233	285	57	34
23	175	e80	e56	e54	e62	e1500	418	216	213	234	54	42
24	167	e77	e56	e54	e63	e2070	379	297	251	192	52	44
25	158	e78	e56	e54	e64	e2800	344	377	325	174	50	43
26	155	e86	e56	e55	e64	e3800	e333	336	296	155	49	40
27	136	e89	e56	e57	e64	e3900	e311	305	265	165	48	38
28	121	e88	e55	e56	e64	10000	302	290	241	163	47	35
29	128	e86	e54	e56	---	5770	287	294	e311	141	48	33
30	163	e84	e54	e57	---	3110	322	289	e1550	124	46	32
31	308	---	e54	e65	---	2650	---	260	---	114	45	---
TOTAL	4115	4425	2007	1663	1712	38546	35575	10939	7374	8197	2152	1102
MEAN	133	148	64.7	53.6	61.1	1243	1186	353	246	264	69.4	36.7
MAX	308	543	82	65	64	10000	8500	717	1550	1180	112	44
MIN	67	77	54	50	58	65	287	211	151	114	45	30
AC-FT	8160	8780	3980	3300	3400	76460	70560	21700	14630	16260	4270	2190
CFSM	.31	.35	.15	.13	.14	2.93	2.79	.83	.58	.62	.16	.09
IN.	.36	.39	.18	.15	.15	3.37	3.11	.96	.65	.72	.19	.10

e Estimated

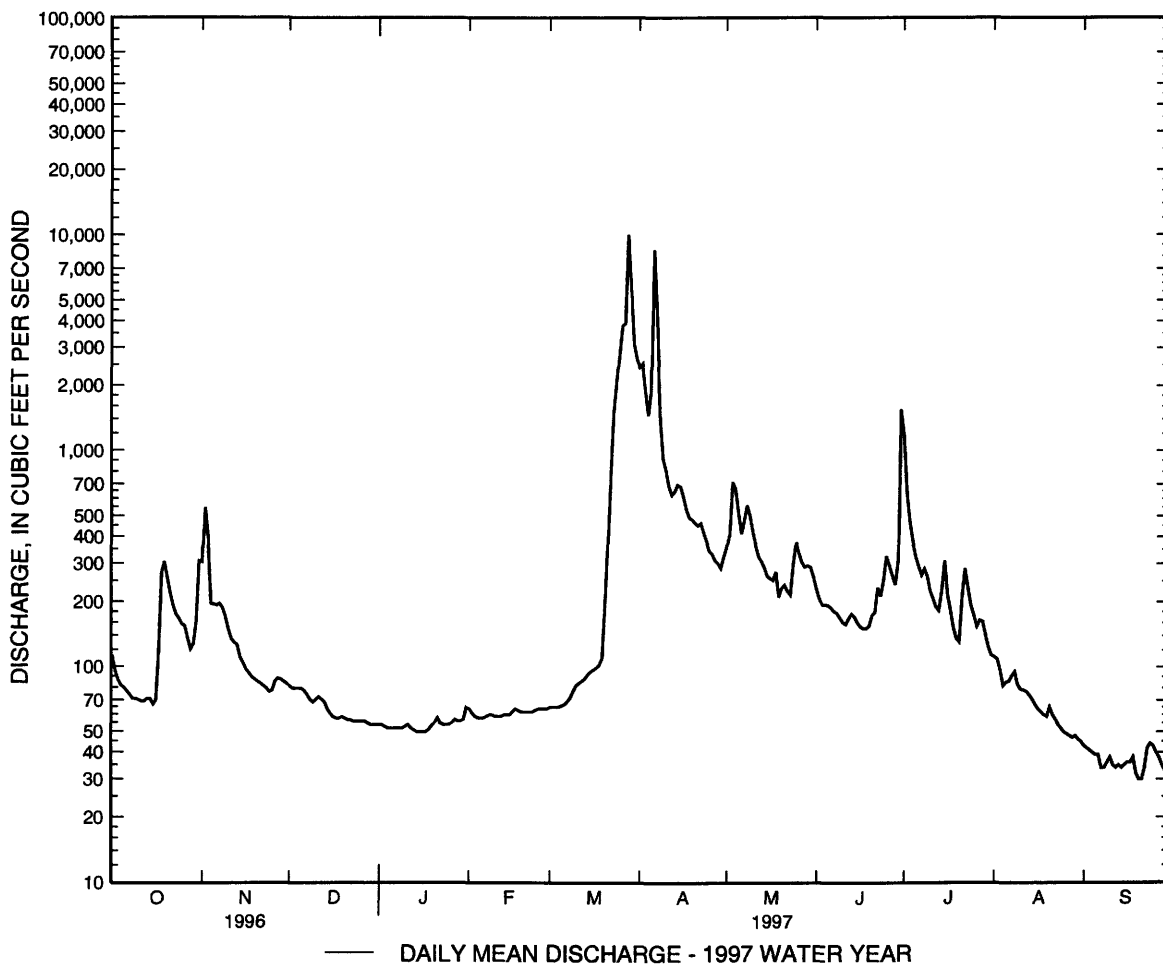
BIG SIOUX RIVER BASIN

06483000 ROCK RIVER AT LUVERNE, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1911 - 1997, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	192	90.0	36.3	44.5	62.1	474	320	198	548	103	55.9	67.8
MAX	444	224	76.1	53.6	91.7	1243	1186	353	1951	264	90.3	135
(WY)	1996	1996	1996	1997	1912	1997	1997	1997	1914	1997	1996	1996
MIN	12.9	10.5	7.74	35.3	33.6	84.0	29.2	82.8	21.6	10.9	19.2	14.2
(WY)	1913	1913	1913	1996	1996	1912	1914	1912	1912	1912	1912	1912

SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR		FOR 1997 WATER YEAR		WATER YEARS 1911 - 1997	
ANNUAL TOTAL	52749		117807		250	
ANNUAL MEAN	144		323		323	
HIGHEST ANNUAL MEAN					1997	
LOWEST ANNUAL MEAN					178	
HIGHEST DAILY MEAN	1540	Jun 18	10000	Mar 28	11200	Jun 13 1914
LOWEST DAILY MEAN	22	Feb 1	30	Sep 20	6.0 ^a	Feb 1 1912
ANNUAL SEVEN-DAY MINIMUM	23	Jan 29	34	Sep 16	6.0	Feb 1 1912
INSTANTANEOUS PEAK FLOW			13600	Mar 28	35400	May 8 1993
INSTANTANEOUS PEAK STAGE			11.69	Mar 28	14.23	May 8 1993
ANNUAL RUNOFF (AC-FT)	104600		233700		181200	
ANNUAL RUNOFF (CFSM)	.34		.76		.59	
ANNUAL RUNOFF (INCHES)	4.62		10.31		8.00	
10 PERCENT EXCEEDS	279		495		309	
50 PERCENT EXCEEDS	92		88		57	
90 PERCENT EXCEEDS	35		50		10	

^a Backwater from ice.

Discharge at
High-Flow Partial-Record Stations
and
Miscellaneous Sites

High-Flow Partial-Record Stations

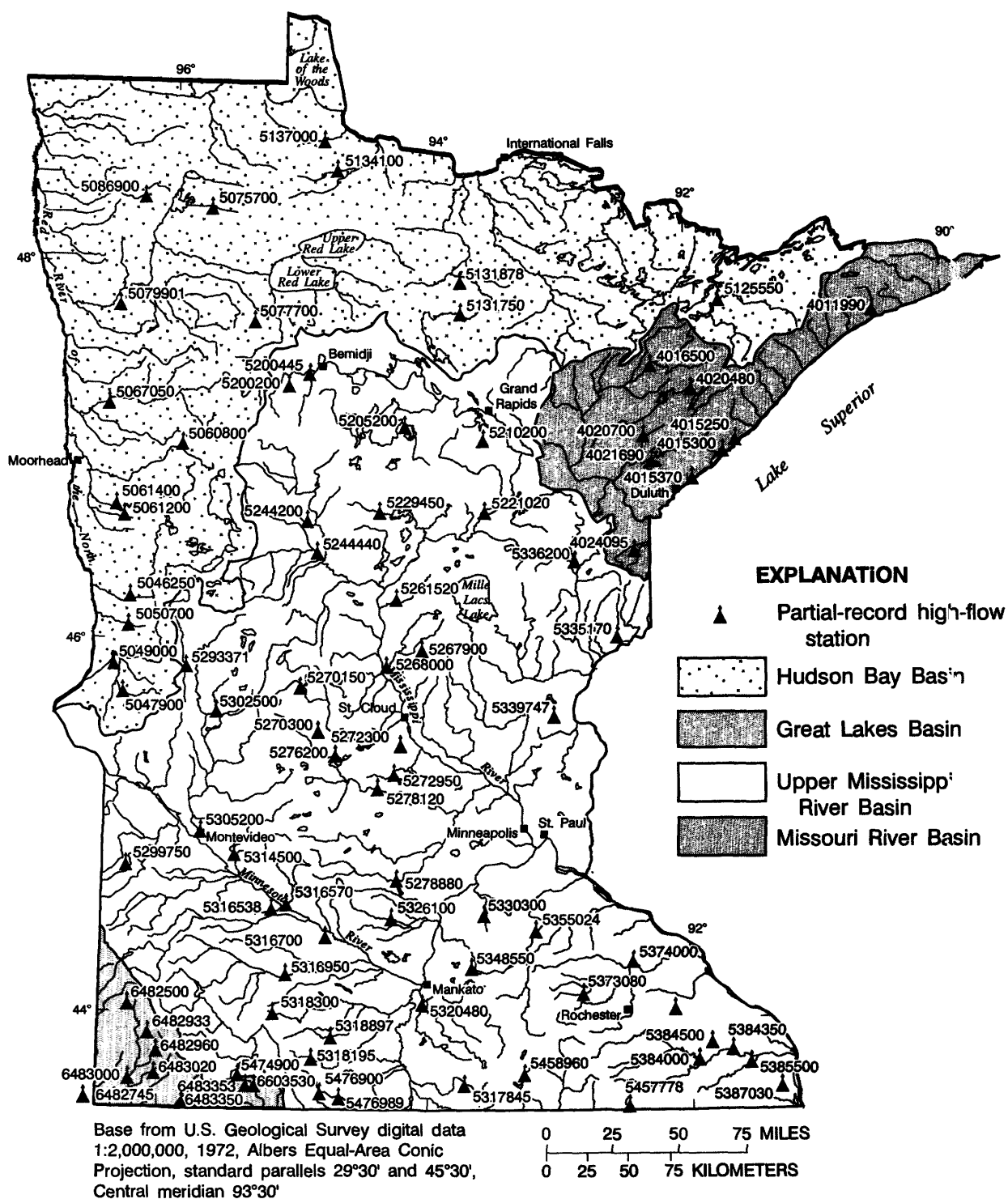


Figure 9.--Location of high-flow partial-record stations.

DISCHARGE AT HIGH-FLOW PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

As the number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or flood-flow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Records collected at high-flow partial-record stations are presented in a table of annual maximum stage and discharge. Discharge measurements made at miscellaneous sites for both low flows and high flows are given in a second table.

High-Flow Partial-Record Stations

The following table contains annual maximum discharges for high-flow(crest-stage) partial-record stations. A crest-stage gage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. The years given in the period of record represent water years for which the annual maximum has been determined.

Annual maximum discharge at high-flow sites during water year 1997

Station No.	Station Name	Location	Drainage area (mi ²)	Period of Record	Annual Maximum		
					Date	Gage height (feet)	Discharge (ft ³ /s)
04011990	Cascade River near Grand Marais, MN	Lat 47°47'24", long 90°31'35", in SE 1/4 sec.1, T. 61 N., R. 2 W., Cook County, Hydrologic Unit 04010101, at bridge on Forest Road 45, 6.6 miles upstream from mouth, 9.5 miles west of Grand Marais.	87.6	1985-current year	5-12-97	12.16a	1,200
04015250	Silver Creek tributary near Two Harbors, MN	Lat 47°04'40", long 91°36'49", in SW 1/4 NE 1/4 sec. 16, T. 53 N., R. 10 W., Lake County, Hydrologic Unit 04010102, at culvert on County Highway 3, 1.0 mile upstream from mouth, 4.5 miles northeast of Two Harbors.	3.62	1965-current year	6-24-97	10.10a	880
04015300	Little Stewart River near Two Harbors, MN	Lat 47°03'52", long 91°40'03", in SE 1/4 NE 1/4 sec. 24, T. 53 N., R. 11 W., Lake County, Hydrologic Unit 04010102, at culvert on County Highway 2, 2.0 miles upstream from mouth, 2.7 miles north of Two Harbors.	4.96	1960-current year	6-24-97	10.87	214
04015370	Talmadge River at Duluth, MN	Lat 46°53'20", long 91°55'21", in SE 1/4 NE 1/4 sec.24, T.51 N., R.13 W., St. Louis County, Hydrologic Unit 04010102, at culvert on U.S. Highway 61, 0.6 mile upstream from mouth, 0.5 mile northeast of Duluth city limits.	5.86	1964-current year	6-24-97	17.54	610
04016500	St Louis River near Aurora, MN	Lat 47°29'30", long 92°14'20", in NW 1/4 SW 1/4 sec.22, T.58 N., R.15 W., St. Louis County, Hydrologic Unit 04010201, at bridge on County Highway 100, 0.8 mile downstream from Partridge River and 1.5 mile south of Aurora.	293	1942-87#, 1988-current year	4-8-97	4.15	1,390

Annual maximum discharge at high-flow sites during water year 1997

Station No.	Station Name	Location	Drainage area (mi ²)	Period of Record	Annual Maximum		
					Date	Gage height (feet)	Discharge (ft ³ /s)
04020480	North Branch Whiteface River near Fairbanks, MN	Lat 47°22'20", long 91°56'28", in NW¼NW¼ sec. 1, T. 56 N., R. 13 W., St. Louis County, Hydrologic Unit 04010201, at culvert on County Highway 16, 2 miles upstream from the mouth of Jenkins Creek, 0.7 mile west of Fairbanks.	17.1	1979-current year	4-16-97	11.86bc	81
04020700	Bug Creek at Shaw, MN	Lat 47°06'40", long 92°21'03", in SW¼SE¼ sec. 34, T. 54 N., R. 16 W., St. Louis County, Hydrologic Unit 04010201, at culverts on County Road 15 at Shaw, 7.5 miles upstream from mouth.	24.8	1979-current year	6-24-97	14.05c	336
04021690	Cloquet River near Toimi, MN	Lat 47°21'00", long 91°39'30", in NE¼SW¼ sec. 7, T. 56 N., R. 10 W., Lake County, Hydrologic Unit 04010202, at bridge on County Highway 2, 5.8 miles southeast of Toimi, 23 miles north of Two Harbors.	40.8	1986-current year	6-25-97	6.71	530
04024095	Nemadji River near Holyoke, MN	Lat 46°31'04", long 92°23'22", in NE¼NE¼ sec. 32, T. 47 N., R. 16 W., Carlton County, Hydrologic Unit 04010301, at bridge on State Highway 23, 3.5 miles north of Holyoke, 7 miles south of Wrenshall.	127	1972-current year	4-6-97	11.79b	1675
05046250	Ottertail River near Foxhome, MN	Lat 46°12'48", long 96°18'24", in SW¼SW¼ sec. 26, T. 132 N., R. 45 W., Wilkin County, Hydrologic Unit 09020103, at bridge on County Road 19, 4 miles south of Foxhome., 10.8 miles below Orwell Dam.	--	1990-current year	4-4-97	18.10c	1,990
05047900	Twelvemile Creek near Dumont, MN	Lat 45°42'58", long 96°20'54", in SE¼SW¼ sec. 17, T. 126 N., R. 45 W., Traverse County, Hydrologic Unit 09020102, at bridge on Traverse County Road 6, 3 miles east of Dumont.	--	1996-current year	4-6-97	13.63	†
05049000	Mustinka River above Wheaton, MN	Lat 45°49'15", long 96°29'25", in SW¼ sec. 8, T. 127 N., R. 46 W., Traverse County, Hydrologic Unit 09020102, at bridge on U.S. Highway 75, 1 mile upstream from Chicago, Milwaukee and St. Paul railroad bridge, 0.5 mile north of Wheaton, about 8 miles above Lake Traverse.	810	1915-24#, 1930-58#, 1985-current year	4-7-97	23.63	8,800
05050700	Rabbit River near Nashua, MN	Lat 46°04'30", long 96°18'24", in SE¼NE¼ sec. 15, T. 130 N., R. 45 W., Wilkin County, Hydrologic Unit 09020101, at bridge on County Road 19, 2.6 miles north of Nashua, 4.8 miles upstream from mouth of South Fork Rabbit River.	99.2	1979-current year	4-5-97	15.76bc	1,640
05060800	Buffalo River near Callaway, MN	Lat 47°01'17", long 95°54'43", in SW¼SW¼ sec. 17, T. 141 N., R. 41 W., Becker County, Hydrologic Unit 09020106, at culvert on U.S. Highway 59, 2.7 miles north of Callaway.	76.4	1960-current year	4-5-97	18.06bc	560

Annual maximum discharge at high-flow sites during water year 1997

Station No.	Station Name	Location	Drainage area (mi ²)	Period of Record	Annual Maximum		
					Date	Gage height (feet)	Discharge (ft ³ /s)
05061200	Whiskey Creek at Barnesville, MN	Lat 46°39'35", long 96°25'54", in SE ¹ / ₄ SW ¹ / ₄ sec. 20, T. 137 N., R. 45 W., Clay County, Hydrologic Unit 09020106, at culvert on State Highway 34, 0.7 mile upstream from Blue Eagle Lake, 1.0 mile northeast of Barnesville.	76.3	1961-64, 1965-66#, 1967-current year	4-5-97	8.04b	340
05061400	Spring Creek above Downer, MN	Lat 46°44'37", long 96°25'12", in NW ¹ / ₄ NW ¹ / ₄ sec. 30, T. 138 N., R. 45 W., Clay County, Hydrologic Unit 09020106, at culvert on county road, 3.1 miles east of Downer.	7.93	1961-current year	4-5-97	10.82a	234
05067050	Marsh River Ditch near Ada, MN	Lat 47°17'46", long 96°26'09", in NE ¹ / ₄ NE ¹ / ₄ sec. 13, T. 144 N., R. 46 W., Norman County, Hydrologic Unit 09020108, at bridge on County Highway 24, 3.5 miles southeast of Ada.	--	1985-current year	4-3-97	19.38b	†
05075700	Mud River near Grygla, MN	Lat 48°19'31", long 95°44'35", in NE ¹ / ₄ NE ¹ / ₄ sec. 23, T. 156 N., R. 40 W., Hydrologic Unit 09020304, Marshall County, at bridge on State Highway 89, 6 miles west of Grygla.	150	1979-current year	4-16-97	19.00b	1,400
05077700	Ruffy Brook near Gonvick, MN	Lat 47°44'50", long 95°24'45", in SE ¹ / ₄ SE ¹ / ₄ sec. 5, T. 149 N., R. 37 W., Clearwater County, Hydrologic Unit 09020305, at culvert on County Highway 67, 4.0 miles upstream from mouth, 4.8 miles east of Gonvick.	46.2	1960-78#, 1979-85, 1986#, 1987-current year	4-14-97	5.24ac	390
05079901	Burnham Creek near Crookston, MN	Lat 47°43'59", long 96°39'52", in SE ¹ / ₄ SW ¹ / ₄ sec. 10, T. 149 N., R. 47 W., Polk County, Hydrologic Unit 09020303, at triple box culvert on U.S. Highway 75, 0.75 mile northeast of Girard, 3 miles southwest of Crookston, 7 miles above mouth.	134	1986-current year	4-15-97	22.63	3 000
05086900	Middle River near Newfolden, MN	Lat 48°22'04", long 96°16'47", in NE ¹ / ₄ NE ¹ / ₄ sec. 3, T. 156 N., R. 44 W., Marshall County, Hydrologic Unit 09020309, at bridge on township road, 2.0 miles north-east of Newfolden.	88.8	1979-current year	4-19-97	18.71	2.000
05125550	Stony River near Babbitt, MN	Lat 47°41'36", long 91°45'38", in SW ¹ / ₄ SW ¹ / ₄ sec.8, T.60 N., R.11 W., Lake County, Hydrologic Unit 09030001, in Superior National Forest, at bridge on Forest Road 424, 4.7 miles upstream from mouth, 8.5 miles southeast of Babbitt.	215	1975-80#, 1986-current year	5-8-97	6.26	930
05131750	Big Fork River near Bigfork, MN	Lat 47°44'56", long 93°46'31", in SW ¹ / ₄ NE ¹ / ₄ sec.27, T.61 N.,R.27 W., Itasca County, Hydrologic Unit 09030006, at bridge on State Highway 6, 5.5 miles west of Bigfork.	606	1973-current year	4-9-97	14.53bc	1.490

Annual maximum discharge at high-flow sites during water year 1997

Station No.	Station Name	Location	Drainage area (mi ²)	Period of Record	Annual Maximum		
					Date	Gage height (feet)	Discharge (ft ³ /s)
05131878	Bowerman Brook near Craigville, MN	Lat 47°55'29", long 93°45'34", in NE 1/4 NW 1/4 sec. 26, T. 63 N., R. 27 W., Koochiching County, Hydrologic Unit 09030006, at culvert on State Highway 6, 2.4 miles upstream from mouth, 7.0 miles west of Craigville.	25.7	1979-current year	4-6-97	15.83b	450
05134100	North Branch Rapid River near Baudette, MN	Lat 48°31'56", long 94°38'50", in NW 1/4 SW 1/4 sec. 4, T. 158 N., R. 31 W., Lake of the Woods County, Hydrologic Unit 09030007, at bridge on County Highway 1, 12.7 miles southwest of Baudette.	174	1986-current year	5-18-96 4-22-97	13.27 11.80	1.550 1.150
05137000	Winter Road River near Baudette, MN	Lat 48°42'39", long 94°41'52", in NW 1/4 NE 1/4 sec. 1, T. 160 N., R. 32 W., Lake of the Woods County, Hydrologic Unit 09030008, at bridge on State Highway 11, 4.5 miles west of Baudette, 1.8 miles east of Pitt, 5 miles upstream of mouth.	140	1986-current year	4-20-97	12.29ac	1.140
05200200	Hennepin Creek near Becida, MN	Lat 47°23'52", long 95°05'12", in NW 1/4 NE 1/4 sec. 11, T. 145 N., R. 35 W., Hubbard County, Hydrologic Unit 07010101, at culvert on Stumphges Rapids Trail approximately 0.5 mile west of Hubbard County Road 3, 3 miles north of Becida, 1.5 miles upstream from mouth.	36.0	1979-current year	4-5-97	13.99bh	100
05200445	Mississippi River at Bemidji, MN	Lat 46°27'04", long 94°54'23", in NW 1/4 NW 1/4 sec. 20, T. 146 N., R. 33 W., Beltrami County, Hydrologic Unit 07010101, at bridge on County Highway 11, 1.4 miles southwest of intersection of State Highway 197 and County Highway 7 in Bemidji.	358	1973-87, 1988-89#, 1990-current year	4-18-97	13.17	1.820
05205200	Boy River near Remer, MN	Lat 47°04'51", long 94°05'54", in SE 1/4 SE 1/4 sec. 28 T. 142 N., R. 27 W., Cass County, Hydrologic Unit 07010102, at bridge on County Highway 53, 1.9 miles upstream from Boy Lake and 9 miles northwest of Remer.	289	1986-current year	4-5-97	11.10	590
05210200	Smith Creek near Hill City, MN	Lat 47°04'58", long 93°34'59", in SE 1/4 NW 1/4 sec. 13, T. 53 N., R. 26 W., Itasca County, Hydrologic Unit 07010101, at culvert on U.S. Highway 169, 6.2 miles north of Hill City.	8.01	1961-current year	4-6-97	5.72	93
05221020	Willow River below Palisade, MN	Lat 46°42'36", long 93°33'21", in NW 1/4 NE 1/4 sec. 30, T. 49 N., R. 25 W., Aitkin County, Hydrologic Unit 07010103, at bridge on County Highway 3, 3.2 miles west of Palisade.	523	1972-current year	4-15-97	16.11	3 020

Annual maximum discharge at high-flow sites during water year 1997

Station No.	Station Name	Location	Drainage area (mi ²)	Period of Record	Annual Maximum		
					Date	Gage height (feet)	Discharge (ft ³ /s)
05229450	Pine River near Pine River, MN	Lat 48°41'39", long 94°22'11", in NE ¹ / ₄ SE ¹ / ₄ sec.8, T.137 N., R.29 W., Cass County, Hydrologic Unit 07010105, at bridge 2.3 miles southeast of Pine River, on U.S. Highway 371, 4.9 miles upstream of upper Whitefish Lake.	261	1986-current year	4-6-97	5.19a	1,410
05244200	Cat River near Nimrod, MN	Lat 46°37'49", long 94°55'51", in SW ¹ / ₄ SW ¹ / ₄ sec.36, T.137 N., R.34 W., Wadena County, Hydrologic Unit 07010106, at bridge on State Highway 227, 2.5 miles west of Nimrod, 3.0 miles upstream from mouth.	57.1	1961-current year	4-6-97	8.21	400
05244440	Leaf River near Aldrich, MN	Lat 46°27'25", long 94°50'29", in SW ¹ / ₄ SW ¹ / ₄ sec.34, T.135 N., R.33 W., Wadena County, Hydrologic Unit 07010107, at bridge on County Highway 29, 3.3 miles upstream from mouth, 7.0 miles northeast of Aldrich.	870	1972-current year	4-6-97	16.79b	3,800
05261520	Nokasippi River near Fort Ripley, MN	Lat 46°12'02", long 94°19'03", in NE ¹ / ₄ NE ¹ / ₄ sec. 24, T.43 N., R.32 W., Crow Wing County, Hydrologic Unit 07010104, at bridge on County Highway 2, 3 miles northeast of Fort Ripley.	193	1967-70+, 74+, 1976+, 1986-current year	4-9-97	14.93a	1,030
05267900	Hillman Creek near Pierz, MN	Lat 45°58'27", long 94°04'21", in NE ¹ / ₄ SE ¹ / ₄ sec. 9, T.40 N., R.30 W., Morrison County, Hydrologic Unit 07010201, at bridge on county highway, 1.1 miles upstream from mouth, 1.5 miles east of Pierz.	45.0	1964-current year	4-2-97	13.95a	820
05268000	Platte River at Royalton, MN	Lat 45°50'43", long 94°17'40", in SE ¹ / ₄ NW ¹ / ₄ sec.26, T.39 N., R.32 W., Morrison County, Hydrologic Unit 07010201, at bridge on County Highway 27, 0.6 mile north of Royalton, 6.6 miles upstream from mouth.	432	1929-36, 1972-current year	4-5-97	14.72	3,800
05270150	Ashley Creek near Sauk Centre, MN	Lat 45°46'46", long 94°58'52", in NW ¹ / ₄ SE ¹ / ₄ sec.29, T.127 N., R.34 W., Todd County, Hydrologic Unit 07010202, at bridge on County Highway 11, 3 miles north of Sauk Centre.	119	1963-70+, 74+, 1976+, 1986-88, 1989#, 1990-current year	4-6-97	17.12a	740
05270300	Sauk River tributary at Spring Hill, MN	Lat 45°31'22", long 94°48'31", in SW ¹ / ₄ NE ¹ / ₄ sec.27, T.124 N., R.33 W., Stearns County, Hydrologic Unit 07010202, at culvert on State Highway 4, 1.0 mile east of Spring Hill, 2.7 miles upstream from mouth.	7.11	1960-current year	3-31-97	14.34b	360

Annual maximum discharge at high-flow sites during water year 1997

Station No.	Station Name	Location	Drainage area (mi ²)	Period of Record	Annual Maximum		
					Date	Gage height (feet)	Discharge (ft ³ /s)
05272300	Johnson Creek near St. Augusta, MN	Lat 45°27'49", long 94°09'19", in NW¼SW¼ sec.13, T.123 N., R.28 W., Stearns County, Hydrologic Unit 07010203, at bridge on County Highway 7, 1.0 mile south of St. Augusta, 3.3 miles upstream from mouth.	45.6	1964-current year	4-2-97	13.95	550
05272950	Clearwater River near South Haven, MN	Lat 45°16'45", long 94°15'04", in NE¼NW¼ sec.19, T.121 N., R.28 W., Wright County, Hydrologic Unit 07010203, at culvert 3.4 miles southeast of Kimball, 0.25 mile downstream of Scott Lake Outlet, 2.0 miles southeast of South Haven.	78.8	1985-current year	4-1-97	16.62bc	739
05276200	North Fork Crow River at Paynesville, MN	Lat 45°23'09", long 94°42'41", in SW¼SE¼ sec.9, T. 122 N., R.32 W., Stearns County, Hydrologic Unit 07010204, at bridge on county road at northeast edge of Paynesville city limits.	243	1973-current year	4-3-97	8.85a	2,460
05278120	North Fork Crow River near Kingston, MN	Lat 45°12'13", long 94°23'16", in SW¼SE¼ sec.13, T. 120 N., R. 30 W., Meeker County, Hydrologic Unit 07010204, at bridge on State Highway 24, 3.7 miles west of Kingston, 3.9 miles east of Forest City.	779	1986-current year	4-5-97	16.26ac	3,540
05278880	Buffalo Creek near New Auburn, MN	Lat 44°43'02", long 94°11'34", in NW¼NW¼ sec. 14, T. 114 N., R. 28 W., Sibley County, Hydrologic Unit 07010205, at bridge on Ideal Ave., 3.3 miles southwest of Glencoe and 3.0 miles northeast of New Auburn.	--	1996-current year	4-3-97	24.19	4,000
05293371	Pomme de Terre River near Elbow Lake, MN	Lat 45°57'47", long 95°53'07", in SE¼SW¼ sec. 19, T. 129 N., R. 41 W., Grant County, Hydrologic Unit 07020002, at bridge on County Road 47, 4 miles southeast of Elbow Lake, 2.5 miles south of the outlet of Pomme de Terre Lake.	340	1986-current year	4-7-97	6.72	550
05299750	Florida Creek near Burr, MN	Lat 44°49'00", long 96°25'10", in SE¼SE¼ sec. 29, T. 115 N., R.46 W., Yellow Medicine County, Hydrologic Unit 07020003, at culvert on County Road 15, 3.0 miles west of Burr, 7.6 miles northwest of Canby.	77.3	1982, 1983-84#, 1991-current year	4-1-97	26.57	†
05302500	Little Chippewa River near Starbuck, MN	Lat 45°36'52", long 95°37'12", in NW¼NE¼ sec.30, T. 125 N., R.39 W., Pope County, Hydrologic Unit 07020005, at culvert on State Highway 28, 4.4 miles west of Starbuck.	96.2	1979-current year	4-6-97	15.45b	850
05305200	Spring Creek near Montevideo, MN	Lat 44°58'41", long 95°42'57", in NW¼NW¼ sec. 5, T. 117 N., R. 40 W., Chippewa County, Hydrologic Unit 07020005, at culvert on State Highway 29, 1.2 miles upstream from mouth, 2.0 miles north of Montevideo.	15.8	1959-current year	4-1-97	18.04	475

Annual maximum discharge at high-flow sites during water year 1997

Station No.	Station Name	Location	Drainage area (mi ²)	Period of Record	Annual Maximum		
					Date	Gage height (feet)	Discharge (ft ³ /s)
05314500	Hawk Creek near Maynard, MN	Lat 44°52'10", long 95°28'58", in SW 1/4 NW 1/4 sec. 7, T. 116 N., R. 38 W., at Renville and Chippewa County line, Hydrologic Unit 07020004, at bridge on State Highway 23, 3.0 miles southwest of Maynard.	315	1949-54#, 1981-current year	4-2-97	21.78c	5,500
05316538	Ramsey Creek near Redwood Falls, MN	Lat 44°33'08", long 95°10'38", in SE 1/4 NE 1/4 sec. 33, T. 113 N., R. 36 W., Redwood County, Hydrologic Unit 07020006 at bridge on township road 2.3 miles northeast of KLGR radio towers, on west side of Redwood Falls.	--	1991-93, 1995-current year	3-28-97	24.87	825
05316570	Beaver Creek at Beaver Falls, MN	Lat 44°35'03", long 95°02'49", in NE 1/4 NW 1/4 sec. 22, T. 113 N., R. 35 W., Renville County, Hydrologic Unit 07020004, at bridge on County Highway 2 in Beaver Falls, 2.2 miles upstream from mouth, 3.8 miles northwest of Morton.	191	1972-current year	4-2-97	14.73	3,300
05316700	Spring Creek near Sleepy Eye, MN	Lat 44°24'12", long 94°44'41", in NE 1/4 SE 1/4 sec. 24, T. 111 N., R. 33 W., Brown County, Hydrologic Unit 07020007, at culvert on county highway, 4.3 miles upstream from mouth, 7.5 miles north of Sleepy Eye.	32.8	1959-current year	3-30-97	15.81a	700
05316950	Cottonwood River near Springfield, MN	Lat 44°12'12", long 95°02'53", on line between secs. 33 and 34, T. 109 N., R. 35 W., Brown County, Hydrologic Unit 07020008, at bridge on County Highway 2, 1.3 miles downstream from Mound Creek, 1.0 mile upstream from Coal Mine Creek, 3.5 miles southwest of Springfield.	777	1973-current year	3-29-97	28.77	7,840
05317845	East Branch Blue Earth River near Walters, MN	Lat 43°37'58", long 93°42'28", in SE 1/4 SE 1/4 sec. 16, T. 102 N., R. 24 W., Faribault County, Hydrologic Unit 07020009, at culvert on State Highway 22, 2.5 miles northwest of Walters.	30.2	1979-current year	7-14-97	16.12ac	235
05318195	Elm Creek near Trimont, MN	Lat 43°45'27", long 94°50'30", in NW 1/4 NW 1/4 sec. 5, T. 103 N., R. 33 W., Martin County, Hydrologic Unit 07020009, at bridge on County Road 103, 12.5 miles northeast of Jackson, 5 miles west of Trimont.	--	1991-current year	3-22-97	22.92	1,950
05318300	Watowwan River near Delft, MN	Lat 43°59'55", long 95°07'11", in NE 1/4 SE 1/4 sec. 11, T. 106 N. R. 36 W., Cottonwood County, Hydrologic Unit 07020010, at culvert on U.S. Highway 71, 1.7 miles northwest of Delft.	13.5	1960-current year	4-1-97	17.58	840

Annual maximum discharge at high-flow sites during water year 1997

Station No.	Station Name	Location	Drainage area (mi ²)	Period of Record	Annual Maximum		
					Date	Gage height (feet)	Discharge (ft ³ /s)
05318897	South Fork Watonwan River near Ormsby, MN	Lat 43°53'08", long 94°41'27", in SE 1/4 NW 1/4 sec. 21, T. 105 N., R. 32 W., Watonwan County, Hydrologic Unit 07020010, at bridge on township road, 2.6 miles north of Ormsby, 5.0 miles upstream from Willow Creek.	107	1979-current year	3-27-97	12.87c	400
05320480	Maple River near Rapidan, MN	Lat 44°03'54", long 94°01'32", in SW 1/4 SW 1/4 sec. 13, T. 107 N., R. 27 W., Blue Earth County, Hydrologic Unit 07020011, at bridge on County Highway 35, 3.0 miles southeast of Rapidan, 3.3 miles upstream from mouth.	338	1972-current year	3-23-97	10.39	2,000
05326100	Middle Branch Rush River near Gaylord, MN	Lat 44°30'27", long 94°15'00", in SW 1/4 NW 1/4 sec. 18, T. 112 N., R. 28 W., Sibley County, Hydrologic Unit 07020012, at bridge on township road, 3.0 miles southwest of Gaylord, 10.5 miles upstream from the main branch of Rush River.	67.3	1979-current year	3-28-97	19.22c	3,200
05330300	Sand Creek near New Prague, MN	Lat 44°32'37", long 93°32'16", in NE 1/4 NW 1/4 sec. 1, T. 112 N., R. 23 W., Le Sueur County, Hydrologic Unit 07020012, at culvert on State Highway 13 and 19, 1.9 miles east of New Prague.	62.2	1960-current year	7-25-97	11.68c	430
05335170	Crooked Creek near Hinckley, MN	Lat 46°00'42", long 92°31'45", in NE 1/4 NE 1/4 sec. 30, T. 41 N., R. 17 W., Pine County, Hydrologic Unit 07030001, at culvert on State Highway 48, 2.7 miles upstream from mouth, 8 miles south of Duxbury, 19 miles east of Hinckley.	94.4	1966-70+, 74+, 76+, 79-80+, 1986-current year	4-6-97	15.34b	1,500
05336200	Glaishby Brook near Kettle River, MN	Lat 46°27'19", long 92°51'34", in SE 1/4 NW 1/4 sec. 22, T. 46 N., R. 20 W., Carlton County, Hydrologic Unit 07030003, at bridge on State Highways 27 and 73, 1.0 mile upstream from mouth, 2.4 miles south of Kettle River.	27.0	1960-70#, 1971-current year	4-6-97	6.41b	420
05339747	Goose Creek at Harris, MN	Lat 45°35'11", long 92°58'39", in SW 1/4 SW 1/4 sec. 21, T. 36 N., R. 21 W., Chisago County, Hydrologic Unit 07030005, at culverts on County Highway 9, 0.15 mile west of County Highway 30 in Harris, 8 miles above mouth.	47.3	1986-current year	4-6-97	7.21	270
05348550	Cannon River below Sabre Lake near Kilkenny, MN	Lat 44°17'50", long 93°37'44", in NE 1/4 NE 1/4 sec. 31, T. 110 N., R. 23 W., Le Sueur County, Hydrologic Unit 07040002, at bridge on township road, 0.25 mile downstream of Sabre Lake, 3 miles southeast of Kilkenny.	87.9	1985-current year	3-28-97	12.81a	285
05355024	Cannon River at Northfield, MN	Lat 44°27'19", long 93°09'46", in NE 1/4 NE 1/4 sec. 1, T. 111 N., R. 20 W., Rice County, Hydrologic Unit 07040002, at Fifth Street bridge in Northfield.	929	1980-current year	8-16-97	904.16	5,350

Annual maximum discharge at high-flow sites during water year 1997

Station No.	Station Name	Location	Drainage area (mi ²)	Period of Record	Annual Maximum		
					Date	Gage height (feet)	Discharge (ft ³ /s)
05373080	Milliken Creek near Concord, MN	Lat 44°07'13", long 92°49'08", in NW¼NW¼ sec.36, T.108 N., R.17 W., Dodge County, Hydrologic Unit 07040004, at bridge on County Road 9, 8.0 miles upstream from mouth, 2.1 miles southeast of Concord.	22.1	1979-current year	7-25-97	14.32	565
05374000	Zumbro River at Zumbro Falls, MN	Lat 44°17'12", long 92°25'56", in sec.36, T.110 N., R.14 W., Wabasha County, Hydrologic Unit 07040004, in Zumbro Falls, 1,000 ft downstream from Cold Creek, 0.7 mi upstream from bridge on U.S. Highway 63, and 6.3 mi downstream from North Fork.	1,150	1909-17#, 1929-80#, 1990-current year	7-26-97	16.56	9,690
05384000	Root River near Lanesboro, MN	Lat 43°44'58", long 91°58'43", in sec. 1, T.103 N., R.10 W., Fillmore County, Hydrologic Unit 07040008, 0.5 mi upstream from highway bridge, 1.2 mi upstream from South Branch, and 2.5 mi northeast of Lanesboro.	615	1910-17#, 1940-85#, 1986, 87-90#, 1991-current year	3-28-97	8.51a	6,400
05384350	Root River at Rushford, MN	Lat 43°48'11", long 91°45'10", in NE¼NE¼ sec.23, T.104 N., R.8 W., Fillmore County, Hydrologic Unit 07040008, at U.S. Highway 16 bridge on south side of Rushford.	992	1985-current year	3-28-97	22.90b	7,100
05384500	Rush Creek near Rushford, MN	Lat 43°50'00", long 91°46'40", in SW¼SW¼ sec. 3, T.104 N., R.8 W., Fillmore County, Hydrologic Unit 07040008, at bridge, 1.5 miles northwest of Rushford, 3.0 miles upstream from mouth.	132	1942-79#, 1980-current year	3-23-97	3.34b	365
05385500	South Fork Root River near Houston, MN	Lat 43°44'19", long 91°33'50", in NE¼SW¼ sec.9, T.103 N., R.6 W., Houston County, Hydrologic Unit 07040008, at bridge on State Highway 76, 0.5 mile upstream from Badger Creek, 1.5 mile south of Houston.	275	1953-83#, 1985-current year	3-22-97	8.18b	1,670
05387030	Crooked Creek at Freeburg, MN	Lat 43°36'37", long 91°21'39", in SW¼NE¼ sec.30, T.102 N., R.4 W., Houston County, Hydrologic Unit 07060001, at bridge on State Highway 249 at Freeburg 6.5 miles upstream from mouth.	44.8	1979-current year	3-23-97	i	85f
05457778	Little Cedar River near Johnsburg, MN	Lat 43°30'52", long 92°45'19", in NW¼NE¼ sec.33, T.101 N., R.16 W., Mower County, Hydrologic Unit 07080201, at bridge on County Road 6, 1 mile northeast of Johnsburg, 1 mile north of Minnesota-Iowa border.	45.8	1986-current year	3-23-97	13.90b	1,400

Annual maximum discharge at high-flow sites during water year 1997

Station No.	Station Name	Location	Drainage area (mi ²)	Period of Record	Annual Maximum		
					Date	Gage height (feet)	Discharge (ft ³ /s)
05458960	Bancroft Creek at Bancroft, MN	Lat 43°42'09", long 93°21'23", in SW 1/4 SE 1/4 sec.21, T.103 N., R.21 W., Freeborn County, Hydrologic Unit 07080202, at bridge on County Road 14, 1.6 miles northeast of Fountain Lake, 1 mile north of Interstate 90.	28.7	1985+, 1986-current year	3-23-97	6.35b	330
05474900	Elk Creek near Brewster, MN	Lat 43°40'43", long 95°27'10", in NE 1/4 SE 1/4 sec.36, T.102 N., R.39 W., Nobles County, Hydrologic Unit 07100001, on County Highway 1 bridge 0.7 miles south of Brewster.	--	1996-current year	3-21-97	24.47	1,260
05476900	Fourmile Creek near Dunnell, MN	Lat 43°34'57", long 94°46'26", in SW 1/4 NW 1/4 sec.2, T.101 N., R.33 W., Martin County, Hydrologic Unit 07100003, at bridge on State Highway 4, 0.6 mile upstream from mouth, 1.6 miles north of Dunnell.	15.9	1960-current year	3-16-97	13.63b	117
05476989	East Fork Des Moines River near Ceylon, MN	Lat 43°33'53", long 94°39'15", in NW 1/4 SW 1/4 sec.11, T.101 N., R.32 W., Martin County, Hydrologic Unit 07010003, at bridge on County Road 23, 2.4 miles northwest of Ceylon.	128	1986-current year	3-22-97	19.90c	920
06482500	Pipestone Creek near Pipestone, MN	Lat 44°04'54", long 96°18'27", in SE 1/4 SE 1/4 sec.12, T.107 N., R.46 W., Pipestone County, Hydrologic Unit 10170203, at bridge on U.S. Highway 75, 5.5 miles north of Pipestone.	--	1991-current year	3-28-97	18.77bc	537
06482745	Beaver Creek at Valley Springs, S.D.	Lat 43°35'10", long 96°28'20", in NW 1/4 NW 1/4 sec.3, T.101 N., R.47 W., Minnehaha County, South Dakota, Hydrologic Unit 10170203, at bridge on County Road 103 (Valley Drive), 1 mile west of South Dakota-Minnesota border, 2.5 miles south of Interstate 90.	104	1986-current year	3-27-97	21.91	1,300
06482933	Chanarambi Creek near Edgerton, MN	Lat 43°53'59", long 96°03'39", in NW 1/4 SW 1/4 sec.18, T.105 N., R.43 W., Murray County, Hydrologic Unit 10170204, at bridge on township road, 3.8 miles northeast of Edgerton, 7.4 miles upstream from mouth.	57.3	1979-current year	3-22-97	16.70a	850
e06482970	Champepadan Creek at Co. Rd. 18 near Leota, MN	Lat 43°47'24", long 96°00'40", in NW 1/4 NW 1/4 sec.28, T.104 N., R. 43 W., Nobles County, Hydrologic Unit 10170204, at bridge on Nobles County Road 18 near junction with County Road 19, 3 miles south of Leota.	--	1996-current year	4-6-97	17.20	†
06483020	Elk Creek near Lismore, MN	Lat 43°41'38", long 96°00'46", in NE 1/4 SE 1/4 sec. 29, T.103 N., R. 43 W., Nobles County, Hydrologic Unit 10170204, at bridge on Nobles County Road 19, 4.6 miles southwest of Lismore.	--	1996-current year	4-6-97	15.01c	†

Annual maximum discharge at high-flow sites during water year 1997

Station No.	Station Name	Location	Drainage area (mi ²)	Period of Record	Annual Maximum		
					Date	Gage height (feet)	Discharge (ft ³ /s)
06483350	Little Rock River near Rushmore, MN	Lat 43°32'36", long 95°48'58", in NE 1/4 NE 1/4 sec. 24, T. 101 N., R. 42 W., Nobles County, Hydrologic Unit 10170204, at bridge #4967, on County Road 6, 1.5 miles west of Ransom, 5.1 miles south of Rushmore.	--	1991- current year	3-22-97	24.72	520
06483353	Little Rock Creek near Rushmore, MN	Lat 43°32'37", long 95°50'50", in NE 1/4 NW 1/4 sec. 23, T. 101 N., R. 42 W., Nobles County, Hydrologic Unit 10170204, at bridge on County Road 6, 5.5 miles southeast of Rushmore.	--	1996- current year	4-6-97	24.60	†
06603530	Little Sioux River near Spafford, MN	Lat 43°36'08", long 95°15'27", in NE 1/4 NE 1/4 sec. 34, T. 102 N., R. 37 W., Jackson County, Hydrologic Unit 10230003, at bridge on county highway, 1.6 miles downstream from Jackson County ditch No. 11, 5.8 miles east of Spafford.	40.5	1962- current year	3-22-97	8.24	210

+ Operated as low flow site.

d Approximate.

Operated as a continuous-record gaging station.

e Revised.

† Not available at time of printing.

f Discharge estimated

a Affected by shifting control.

g Not previously published.

b Backwater from ice.

h Problem site with beavers

c Not annual maximum gage height.

i Not determined.

Miscellaneous Sites

Discharge measurements made at miscellaneous sites during the 1997 water year are listed in the following table. Those measurements of base flow are designated by an asterisk (*) and measurements from earlier water years but not previously published by an (a). Stations previously published as High-Flow Partial-Record are designated by an (#).

Stream Name and (Station No.)	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Dis- charge (ft ³ /s)
<u>Lake of the Woods Basin</u>						
Lost River near Nett Lake (05131435)	Nett Lake	Lat 48°08'57", long 92°58'36", in SW1/4 NE1/4 sec. 1, T.65 N., R.21 W., St. Louis County, Hydrologic Unit 09030005, at trail road ford, 4.6 miles above mouth at Nett Lake, 5.8 miles northeast of town of Nett Lake.	--	1996-97	11-13-96	24
<u>Mississippi River Basin</u>						
North Fork Crow River near Rockford (05278400)	Crow River	Lat 45°05'44", long 93°47'18", in SE1/4 SE1/4 sec. 23, T.119 N., R.25 W., Wright County, Hydrologic Unit 07010205, at bridge on county road, 2.7 miles west of Rockford. (Gage-height records available, 1909-1910).	1,330	1909-10, 1976	3-31-97	1,260
South Fork Crow River at Biscay (05278590)	Crow River	Lat 44°50'11", long 94°17'16", in SE1/4 SW1/4 sec. 23, T.116 N., R.29 W., McCleod County, Hydrologic Unit 07010205, at bridge on County Highway 4, 1 mile northwest of Biscay.	495	1975-76	3-31-97	282
Coon Creek at 131st Street in Coon Rapids (05288475)	Mississippi River	Lat 45°12'30", long 93°20'02", in SW1/4 NE1/4 sec. 4, T.31 N., R.24 W., Anoka County, Hydrologic Unit 07010206, at bridge on 131st St. in Coon Rapids.	69.4	--	9-25-97	26
Sand Creek at Xeon Street in Coon Rapids (05288487)	Coon Creek	Lat 45°11'02", long 93°17'48", in SE1/4 SW1/4 sec. 11, T.31 N., R.24 W., Anoka County, Hydrologic Unit 07010206, at Xeon St. near bike path entrance in Coon Rapids.	15.4	--	9-26-97	* 7.3
Rice Creek in Fridley (05288598)	Mississippi River	Lat 45°05'37", long 93°14'40", in SW1/4 SW1/4 sec. 12, T.30 N., R.24 W., Anoka County, Hydrologic Unit 07010206, at bike path bridge west of State Highway 65 in Fridley.	141	--	9-15-97	64
Bassett Creek at Dresden Lane in Golden Valley (05288839)	Mississippi River	Lat 45°00'14", long 93°19'51", in NE1/4 NE1/4 sec. 18, T.29 N., R.24 W., Henne- pin County, Hydrologic Unit 07010206, at intersection of Battle Creek Dr. and Dres- den Ln. in Golden Valley.	32.9	--	9-15-97	13
Mississippi River at Lower St. Anthony in Minneapolis (05288920)		Lat 44°58'46", long 93°14'50", in SE1/4 SE1/4 sec. 23, T. 29 N., R. 24 W., Henne- pin County, Hydrologic Unit 09010206, at lower St. Anthony Falls lock and dam in Minneapolis at River mile 853.3 upstream from Ohio River. Discharge measurements made at Hennepin and Franklin Ave. bridges are included.	19,700	1912, 1938-39, 1941,43, 1953-54,57, 1963-85, 1990-96	6-12-97	6,750
Minnehaha Creek at Nicol- let Ave. in Min- neapolis (05289600)	Mississippi River	Lat 44°54'27", long 93°16'41", in SE1/4 SW1/4 sec. 15, T.28 N., R.24 W., Henne- pin County, Hydrologic Unit 07010206, at bridge on Nicollet Ave. in Minneapolis.	149	--	8-11-97	112

Stream Name and (Station No.)	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Dis- charge (ft ³ /s)
<u>Minnesota River Basin</u>						
Shakopee Creek near Louriston (05303900)	Chippewa River	Lat 45°08'16", long 95°28'12", in SW1/4 SW1/4 sec. 5, T.119 N., R.38 W., Chippewa County, Hydrologic Unit 07020005, at bridge on 15th Ave. NW east of County Road 4, 4 miles northwest of Louriston.	149	--	8-11-97	105
Dry Weather Creek near Watson (05304795)	Chippewa River	Lat 45°02'33", long 95°45'33", in NE1/4 SE1/4 sec. 11, T.118 N., R.41 W., Chippewa County, Hydrologic Unit 07020005, at bridge on County Rd 35, 4.5 miles northeast of Watson.	105	--	8-12-97	* 6.7
Yellow Medi- cine River near Taunton	Minnesota River	Lat 44°36'05", long 96°06'30", in SE1/4 SW1/4 sec. 12, T.113 N., R.44 W., Lincoln County, Hydrologic Unit 07020004, at bridge on township road, 2 miles northwest of Taunton.	--	--	4-1-97 4-3-97 4-11-97 4-22-97 9-26-97	689 447 258 104 * 6.0
North Branch Yellow Medi- cine River near Taunton	Yellow Medi- cine River	Lat 44°36'58", long 96°06'28", in NE1/4 NW1/4 sec. 12, T.113 N., R.44 W., Lin- coln County, Hydrologic Unit 07020004, at bridge on township road, 3 miles north- west of Taunton.	--	--	4-1-97 4-3-97 4-11-97 4-22-97 9-25-97	850 446 127 63 3.0
Mud Creek near Taunton	Yellow Medi- cine River	Lat 44°38'36", long 96°00'43", in NW1/4 NW1/4 sec. 35, T.114 N., R.43 W., Yellow Medicine County, Hydrologic Unit 07020004, at bridge on township road, 5 miles northeast of Taunton.	--	--	4-2-97 4-22-97 9-26-97	261 69 * 1.9
South Branch Yellow Medi- cine River near Minneota	Yellow Medi- cine River	Lat 44°36'06", long 95°57'11", in SE1/4 SE1/4 sec. 7, T.113 N., R.42 W., Lyon County, Hydrologic Unit 07020004, at bridge on County Road 26, 3 miles north- east of Minneota.	--	--	4-1-97 4-11-97 4-22-97 5-8-97 9-25-97	1510 355 200 112 11
Spring Creek near Spring Creek (05312000)	Yellow Medi- cine River	Lat 44°42'38", long 95°47'16", in NE1/4 SE1/4 sec. 4, T.114 N., R.41 W., Yellow Medicine County, Hydrologic Unit 07020004, 0.5 mile south of State High- way 3, 3.5 miles southeast of Spring Creek.	112	--	8-12-97	14
Spring Creek near Hanley Falls	Yellow Medi- cine River	Lat 44°43'19", long 95°41'08", in NW1/4 SW1/4 sec. 33, T.115 N., R.40 W., Yellow Medicine County, Hydrologic Unit 07020004, at bridge on township road, 5.3 miles northwest of Hanley Falls.	--	--	4-2-97 4-14-97 4-26-97	2310 571 159
Yellow Medi- cine River near Hanley Falls (05313000)	Minnesota River	Lat 44°42'10", long 95°39'35", in NE1/4 NE1/4 sec. 18, T.114 N., R.40 W., Yellow Medicine County, Hydrologic Unit 07020004, at bridge 4.2 miles west of Han- ley Falls.	--	--	3-31-97 4-14-97 4-29-97	5,100 1,750 414
Judicial Ditch 17 near Hanley Falls	Yellow Medi- cine River	Lat 44°41'18", long 95°37'58", in NW1/4 NE1/4 sec. 14, T.114 N., R.40 W., Yellow Medicine County, Hydrologic Unit 07020004, at culvert on County Road 18, 0.5 mile west of Hanley Falls.	--	--	4-22-97 4-29-97	91 48

Stream Name and (Station No.)	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Dis- charge (ft ³ /s)
Minnesota River Basin -- continued						
Chetomba Creek near Renville (05314510)	Spring Creek	Lat 44°50'24", long 95°14'20", in SW1/4 NW1/4 sec. 19, T.116 N., R.36 W., Ren- ville County, Hydrologic Unit 07020004, 0.5 mile upstream of mouth of Judicial Ditch No. 8 at bridge, 4.5 miles northwest of Renville.	120	--	8-25-97	28
Cottonwood River at Co. Rd. 7 near Revere (05316876)	Minnesota River	Lat 44°15'56", long 95°20'58", in NE1/4 NE1/4 sec. 12, T.109 N., R.38 W., Red- wood County, Hydrologic Unit 07020008, at bridge on County Road 7, 3.75 miles north of junction U.S Highway 14 and County Road 7 in Revere.	--	1968	4-1-97	2,050
					4-14-97	774
					4-22-97	450
					4-29-97	322
					5-27-97	138
					9-3-97	57
Dutch Charley Creek at Co. Rd 15, near Lamberton (05316898)	Cottonwood River	Lat 44°13'21", long 95°13'45", on line between sec. 25 and sec. 30, T.109 N., R.36 W., and sec. 25, T. 109 N., R.37 W., at bridge on County Highway 15, 2 miles east of Lamberton.	--	1968, 1974	4-1-97	783
					4-9-97	513
					4-15-97	348
					4-30-97	170
					9-3-97	23
Cottonwood River at Leav- enworth (05316970)	Minnesota River	Lat 44°13'39", long 94°48'22", in SW1/4 SW1/4 sec. 22, T.109 N., R.33 W., Brown County, Hydrologic Unit 07020008 at bridge on County Highway 8, 0.25 miles north of Leavenworth.	876	1965-70, 1973-76	4-1-97	4,120
					4-2-97	3,540
					4-14-97	1,660
					4-22-97	966
					4-30-97	679
					6-3-97	357
					8-15-97	322
Sleepy Eye Creek near Clements (05316980)	Cottonwood River	Lat 44°20'10", long 95°02'48", in SW1/4 NW1/4 sec. 15, T.110 N., R.35 W., Red- wood County, Hydrologic Unit 07020008, at bridge on County Road 1, 3 miles south of Clements.	--	--	4-12-97	1,080
					4-3-97	876
					4-8-97	503
					4-15-97	321
					4-23-97	176
					5-13-97	129
					9-3-97	26
9-23-97	20					
Sleepy Eye Creek near Springfield (05316985)	Cottonwood River	Lat 44°16'33", long 94°54'22", in SW1/4 NW1/4 sec. 2, T.109 N., R.34 W., Brown County, Hydrologic Unit 07020008, at bridge on County Road 16, 5 miles north- east of Springfield.	249	--	8-13-97	89
Sleepy Eye Creek at Co. Rd. 8 near Leavenworth (05316992)	Cottonwood River	Lat 44°15'13", long 94°48'20", in NW1/4 NW1/4 sec. 15, T.109 N., R. 33 W., Brown County, Hydrologic Unit 07020008, at bridge 2 miles north of Leavenworth.	--	--	3-31-97	2,330
					4-2-97	1,660
					4-3-97	1,200
					4-9-97	590
					4-23-97	254
					6-3-97	100
9-3-97	54					
Little Cotton- wood River near Comfrey	Minnesota River	Lat 44°06'29", long 95°02'19", in SW1/4 SW1/4 sec. 34, T.108 N., R.35 W., Brown County, Hydrologic Unit 07020007, at bridge on County Road, 7 miles west of Comfrey.	--	--	7-17-97	49
					9-3-97	* 5.5
Little Cotton- wood River near Searles (05317170)	Minnesota River	Lat 44°14'19", long 94°26'05", in NE1/4 NE1/4 sec. 21, T.109 N., R.30 W., Brown County, Hydrologic Unit 07020007, at bridge on State Highway 15, 1 mile north of Searles.	162	--	8-13-97	49

Stream Name and (Station No.)	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Dis- charge (ft ³ /s)
Minnesota River Basin -- continued						
West Branch Blue Earth River above Elmore (05317800)	Blue Earth River	Lat 43°30'56", long 94°07'41", in SE1/4 SE1/4 sec. 25, T.101 N., R.28 W., Farib- ault County, Hydrologic Unit 07020009, at bridge on County Road 9, 2.5 miles north- west of Elmore.	150	--	8-20-97	26
Coon Creek at U.S. Hwy. 169 near Blue Earth (05317828)	Blue Earth River	Lat 43°36'38", long 94°05'14", in SW1/4 NW1/4 sec. 28, T.102 N., R.27 W., Farib- ault County, Hydrologic Unit 07020009, at bridge on U.S. Hwy. 169, 2 miles south of Blue Earth.	99.1	--	8-20-97	21
East Branch Blue Earth River below Bricelyn (05318050)	Blue Earth River	Lat 43°35'09", long 93°50'52", in NE1/4 NE1/4 sec. 5, T.101 N., R.25 W., Faribault County, Hydrologic Unit 07020009, at bridge on County Road 21, 4 miles north- west of Bricelyn.	186	--	8-20-97	47
South Creek near Huntley (05318138)	Blue Earth River	Lat 43°41'39", long 94°14'52", in NW1/4 SW1/4 sec. 30, T.103 N., R.28 W., Martin County, Hydrologic Unit 07020009, at bridge on County Road 1, 2.5 miles south of Huntley.	104	--	8-14-97	12
Center Creek at Huntley (05318178)	Blue Earth River	Lat 43°43'28", long 94°13'20", in SE1/4 NW1/4 sec. 17, T.103 N., R.28 W., Farib- ault County, Hydrologic Unit 07020009, on County Road, 1.5 miles southeast Hunt- ley.	111	--	8-14-97	10
Elm Creek near Northrop (05318240)	Blue Earth River	Lat 43°46'01", long 94°22'57", in NE1/4 SW1/4 sec. 36, T.104 N., R.30 W., Martin County, Hydrologic Unit 07020009, south of State Highway 44, 4.5 miles northeast of Northrop.	232	--	8-14-97	24
Watonwan River near St. James (05318630)	Blue Earth River	Lat 44°03'03", long 94°39'56", in NW1/4 NE1/4 sec. 27, T.107 N., R.32 W., Wan- tonwan County, Hydrologic Unit 07020010, at bridge on State Highway 30, 5.5 miles northwest of St. James.	99.9	--	8-15-97	33
St. James Creek near La Salle (05318800)	Wantonwan River	Lat 44°03'04", long 94°33'27", in NW1/4 NE1/4 sec. 28, T.107 N., R.31 W., Wan- tonwan County, Hydrologic Unit 07020010, at bridge on County Road 3, 1.4 miles southeast of La Salle.	121	1968-70, 1974-76, 1996	8-21-97	63
South Fork Watonwan River near St. James (05319050)	Wantonwan River	Lat 43°58'45", long 94°30'49", in SE1/4 SE1/4 sec. 14, T.106 N., R.31 W., Wanton- wan County, Hydrologic Unit 07020010, at wayside rest on State Highway 60, 5 miles east of St. James.	192	--	8-19-97	28
Perch Creek below Vernon Center (05319360)	Wantonwan River	Lat 43°59'46", long 94°16'38", in SW1/4 SE1/4 sec. 11, T.106 N., R.29 W., Blue Earth County, Hydrologic Unit 07020010, at bridge on State Highway 32, 8 miles west of Vernon Center.	133	--	8-19-97	22

Stream Name and (Station No.)	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Dis- charge (ft ³ /s)
Minnesota River Basin -- continued						
Le Sueur River near Wilton (05320080)	Blue Earth River	Lat 44°01'38", long 93°32'47", in NW1/4 SW1/4 sec. 36, T.107 N., R.23 W., Waseca County, Hydrologic Unit 07020011, at bridge on County Road 27, 2 miles north- west of Wilton.	173	--	8-18-97	230
Cobb River near Mapleton (05320230)	Le Sueur River	Lat 43°53'56", long 93°52'14", in NE1/4 SE1/4 sec. 18, T.105 N., R.25 W., Blue Earth County, Hydrologic Unit 07020011, at bridge on State Highway 30, 4 miles southeast of Mapleton.	112	--	8-20-97	48
Maple River near Sterling Center	Le Sueur River	Lat 43°56'06", long 94°04'15", in NE1/4 NE1/4 sec. 4, T.105 N., R.27 W., Blue Earth County, Hydrologic Unit 07020011, at bridge on County Road 18, 2.5 miles north of Sterling Center.	317	--	8-19-97	50
Middle Branch Rush River near New Rome (05326150)	Rush River	Lat 44°30'54", long 94°02'59", in NE1/4 NE1/4 sec. 15, T.112 N., R.27 W., Sibley County, Hydrologic Unit 07020012, at bridge on County Road 17, 4 miles south- east of New Rome.	190	--	8-28-97	97
South Branch Rush River near Rush River (05326250)	Rush River	Lat 44°29'08", long 94°02'10", in NW1/4 NE1/4 sec. 26, T.112 N., R.27 W., Sibley County, Hydrologic Unit 07020012, at bridge on County Road 18, 2 miles north- east of Rush River.	180	--	8-21-97	238
High Island Creek near Arlington (05326700)	Minnesota River	Lat 44°37'22", long 94°05'29", in NW1/4 SW1/4 sec. 4, T.113 N., R.27 W., Sibley County, Hydrologic Unit 07020012, at bridge on County Road 9, 1 mile northwest of Arlington.	163	--	8-28-97	192
Minnesota River Trib. on Beech St. in Chaska (05330702)	Minnesota River	Lat 44°47'21", long 93°35'38", in NE1/4 NW1/4 sec. 9, T.115 N., R.23 W., Carver County, Hydrologic Unit 07020012, at bridge on Beech St. in Chaska.	11.6	--	9-26-97	* 3.5
Riley Creek at Eden Prairie (05330750)	Minnesota River	Lat 44°48'23", long 93°28'49", in SE1/4 SE1/4 sec. 32, T.116 N., R.22 W., Henne- pin County, Hydrologic Unit 07020012, on Spring Road in Eden Prairie.	9.9	--	9-25-97	* 9.9
Purgatory Creek on Pio- neer Tr. in Eden Prairie (05330801)	Minnesota River	Lat 44°49'39", long 93°25'20", in SE1/4 NE1/4 sec. 26, T.116 N., R.22 W., Henne- pin County, Hydrologic Unit 07020012, at Pioneer Trail, in Eden Prairie.	27.0	--	9-25-97	41

Stream Name and (Station No.)	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Dis- charge (ft ³ /s)
<u>Mississippi River Basin</u>						
Battle Creek below McKnight Road in St. Paul (05331050)	Mississippi River	Lat 44°56'40", long 93°00'35", in SE1/4 NE1/4 sec. 2, T.28 N., R.22 W., Ramsey County, Hydrologic Unit 07010206, at McKnight Road in St. Paul.	10.2	--	9-29-97	* 2.6
<u>St. Croix River Basin</u>						
Sunrise River at Sunrise (45304909252 2101)	St. Croix River	Lat 45°30'49", long 92°52'21", in SW1/4 SW1/4 sec. 16, T.35 N., R.20 W., Chisago County, Hydrologic Unit 07030005, at bridge on County Highway 9 at Sunrise.	170	--	3-31-97	968
Browns Creek at Stillwater (05341540)	St. Croix River	Lat 45°04'35", long 92°48'21", in NE1/4 NE1/4 sec. 21, T.30 N., R.20 W., Wash- ington County, Hydrologic Unit 07030005, at bridge on State Highway 95 at Stillwa- ter.	30.8	--	3-26-97	20
<u>Des Moines River Basin</u>						
Okabena Creek above Elk Creek near Brewster (05474893)	Jack Creek	Lat 43°39'34", long 95°26'48", in SE1/4 SW1/4 sec. 6, T.102 N., R.38 W., Jackson County, Hydrologic Unit 07100001, at bridge on township road, 8.4 miles south- west of Okabena, 2.0 miles south of Brew- ster.	--	--	5-24-97	48
					6-30-97	60
					8-3-97	* 5.0
Okabena Creek on CSAH 14, near Brewster (05474895)	Jack Creek	Lat 43°40'27", long 95°26'58", in NW1/4 NW1/4 sec. 6, T.102 N., R.38 W., Jackson County, Hydrologic Unit 07100001, at bridge on County State Aid Highway 14, 1 mile south of Brewster, 8 miles southwest of Okabena.	21.8	1995-96	5-23-96	19
					5-30-96	28
					6-18-96	92
					6-19-96	72
					6-20-96	72
					6-29-96	34
					7-20-96	* 8.0
					8-10-96	* 5.8
					8-31-96	* 5.6
					3-23-97	70
					3-26-97	53
					3-27-97	76
					3-29-97	49
					4-19-97	25
					5-3-97	51
					5-24-97	66
					6-30-97	67
					8-3-97	* 5.4
					9-26-97	* 4.6
					10-24-97	* 4.4

Stream Name and (Station No.)	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Dis- charge (ft ³ /s)
<u>Des Moines River Basin</u> ---continued						
Elk Creek on CSAH 1, near Brewster (05474900)	Okabena Creek	Lat 43°40'43", long 95°27'10", in NE1/4 SE1/4 sec. 36, T.103 N., R.39 W., Nobles County, Hydrologic Unit 07100001, bridge on County State Aid Highway 1, 0.9 mile south of Brewster.	61	# 1995-96	5-24-96	41
					5-30-96	75
					6-18-96	686
					6-19-96	400
					6-29-96	69
					8-10-96	* 2.2
					8-31-96	* 5.8
					10-25-96	* 8.2
					3-19-97	159
					3-23-97	401
					3-26-97	184
					5-3-97	112
					5-24-97	68
					6-30-97	249
					8-3-97	* 3.0
Okabena Creek above Okabena (05474915)	South Heron Lake	Lat 43°44'10", long 95°20'06", in NW1/4 SW1/4 sec. 7, T.103 N., R.37 W., Jackson County, Hydrologic Unit 07100001, at bridge on township road, 0.5 mile west of Okabena.	--	1995- 96	5-24-96	87
					5-30-96	154
					9-7-96	10
					3-26-97	880
					5-9-97	260
					7-1-97	437
Jack Creek near Kinbrae (05474945)	Heron Lake	Lat 43°47'26", long 95°35'14", in NE1/4 NW1/4 sec. 25, T.104 N., R.40 W., Nobles County, Hydrologic Unit 07100001, at bridge on township road, 5.5 miles south- west of Kinbrae.	55.6	1995-96	2-20-96	* 6.4
					5-24-96	51
					5-30-96	116
					6-18-96	622
					6-19-96	338
					6-28-96	91
					7-20-96	* 7.8
					8-9-96	* 6.4
					8-31-96	* 0.53
					10-25-96	* 1.6
					3-23-97	333
					3-26-97	206
					5-3-97	92
					5-24-97	42
					6-2-97	28
					7-1-97	353
North Branch Jack Creek near Kinbrae (05474950)	Jack Creek	Lat 43°48'01", long 95°34'21", in SE1/4 NE1/4 sec. 24, T.104 N., R.40 W., Nobles County, Hydrologic Unit 07100001, at bridge on township road, 4.5 miles south- west of Kinbrae.	--	1995-96	2-20-96	23
					5-24-96	75
					5-30-96	139
					6-18-96	794
					6-22-96	479
					6-22-96	515
					6-23-96	433
					6-28-96	155
					7-20-96	* 9.6
					8-9-96	11
					8-31-96	* 1.4
					3-27-97	511
					3-28-97	703
					5-3-97	126
					6-2-97	36
7-2-97	418					
8-3-97	* 6.6					

Stream Name and (Station No.)	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Dis- charge (ft ³ /s)
<u>Des Moines River Basin ---continued</u>						
East Graham Lake outlet on CSAH 1, near Kinbrae (05474965)	Jack Creek	Lat 43°48'09", long 95°28'19", in NW1/4 NW1/4 sec. 24, T.104 N., R.39 W., Nobles County, Hydrologic Unit 07100001, at bridge on County State Aid Highway 1, 1.2 miles south of Kinbrae.	35.9	1995-96	2-20-96	18
					5-24-96	26
					5-30-96	43
					7-20-96	12
					8-10-96	* 5.8
					8-30-96	* 5.8
					3-19-97	64
					3-21-97	108
					3-22-97	137
					5-3-97	39
6-2-97	20					
8-3-97	15					
Jack Creek on township road near Heron Lake (05474975)	Heron Lake	Lat 43°46'34", long 95°20'08", in SW1/4 SW1/4 sec. 30, T.104 N., R.37 W., Jackson County, Hydrologic Unit 07100001, at bridge on township road, 0.8 mile south- west of Heron Lake.	--	1995-96	5-24-96	176
					5-30-96	329
					9-7-96	* 7.8
					10-25-96	20
					3-26-97	903
					5-9-97	267
					7-1-97	659

Water Quality at
Partial-Record Stations
and
Miscellaneous Sites

Water Quality at Partial-Record Stations

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

Water-quality partial-record stations are particular sites where chemical quality, biological and (or) sediment data are collected systematically over a period of years for use in hydrologic analyses. Letter E indicates estimated value. Letter K indicates non-ideal colony count.

05046450 OTTER TAIL RIVER ABOVE BRECKENRIDGE, MN

LOCATION.--Lat 46°15'42", long 96°32'45", in SW1/4 SE1/4 NW 1/4 sec.11, T.123 N., R.47 W., Wilken County, MN, Hydrologic Unit 09020103, at bridge crossing, about 1 mi downstream from Breckenridge Lake, and 2 mi east of Breckenridge, MN.

DRAINAGE AREA.-- Not available.

PERIOD OF RECORD.--May to September 1997.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L) (00310)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM TOTAL RECOVER-ABLE (MG/L) (00918)
MAY 20...	1200	1350	400	8.1	12.5	10.4	1.0	191	44	K20	39
JUN 10...	1045	1130	430	7.7	21.0	8.2	1.0	200	K24	K66	39
JUL 22...	1230	825	453	7.5	25.0	7.3	--	--	100	87	--
AUG 12...	1200	788	402	7.7	22.0	7.9	1.0	199	670	110	39
SEP 16...	1115	635	439	7.6	20.5	8.9	1.0	194	140	220	37

DATE	MAGNE-SIUM, TOTAL RECOVER-ABLE (MG/L) (00921)	SODIUM, TOTAL RECOVER-ABLE (MG/L) (00923)	POTAS-SIUM, TOTAL RECOVER-ABLE (MG/L) (00939)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, TOTAL (MG/L AS N) (00600)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
MAY 20...	26	6.8	3.7	16	9.9	<0.020	<0.010	0.61	0.61	0.61	<0.018
JUN 10...	26	5.0	3.4	15	10	<0.020	<0.010	0.56	0.56	0.56	0.095
AUG 12...	27	6.3	3.7	11	9.4	0.040	0.037	0.75	0.79	0.83	0.075
SEP 16...	27	5.7	4.0	12	12	0.030	<0.010	0.70	0.70	0.73	0.087

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

05046450 OTTER TAIL RIVER ABOVE BRECKENRIDGE, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORGANIC TOTAL (MG/L AS P) (00670)	ALUMI- NUM, TOTAL RECOVER -ABLE (UG/L) (01104)	ANTI- MONY, TOTAL (UG/L AS SB) (01097)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOVER -ABLE (UG/L) (01009)	BERYL- LIUM TOTAL RECOVER -ABLE (UG/L) (00998)	BORON, TOTAL RECOVER -ABLE (UG/L) (00999)	CADMIUM TOTAL RECOVER -ABLE (UG/L) (01113)	CHRO- MIUM, TOTAL RECOVER -ABLE (UG/L) (01118)	COPPER, TOTAL RECOVER -ABLE (UG/L) (01119)
MAY											
20...	20...	<0.010	--	330	0.4	3	85	<0.2	100	<0.02	12
JUN											
10...	10...	0.016	0.09	340	<0.2	2	91	<0.2	80	0.04	13
AUG											
12...	12...	0.045	0.07	720	<1	3	97	<1	200	<1	23
SEP											
16...	16...	0.060	0.09	760	<1	2	92	<1	100	<1	25
DATE	IRON, TOTAL RECOVER- ABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOVER -ABLE (UG/L) (01114)	MANGAN- ESE TOTAL RECOVER -ABLE (UG/L) (01123)	NICKEL, TOTAL RECOVER -ABLE (UG/L) (01074)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SILVER, TOTAL RECOVER -ABLE (UG/L) (01079)	THAL- LIUM, TOTAL RECOVER- ERABLE (UG/L AS TL) (01128)	ZINC, TOTAL RECOVER -ABLE (UG/L) (01094)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE D'AM. % F'NER T'AN MM (70331)
MAY											
20...	640	0.3	60	2	5	<0.04	<0.03	<0.2	43	157	41
JUN											
10...	860	3	90	3	1	0.17	<0.03	6	91	278	68
JUL											
22...	--	--	--	--	--	--	--	--	98	218	88
AUG											
12...	1500	2	90	4	<1	<1	<1.00	20	117	249	84
SEP											
16...	1200	6	60	3	<1	<1	<1.00	20	86	147	81

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

05062095 BUFFALO RIVER AT US HIGHWAY 75 IN GEORGETOWN, MN

LOCATION.--Lat 47°04'30", long 96°47'26", in SE1/4 NW1/4 NW 1/4 sec.32, T.142 N., R.48 W., Clay County, MN, Hydrologic Unit: 09020106, at U.S. Highway 75 bridge in Georgetown, MN.

DRAINAGE AREA.-- Not determined.

PERIOD OF RECORD.--May to September 1997.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L) (00310)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR PER (COLS. RECOVER-ABLE) (31673)	CALCIUM TOTAL (MG/L) (00918)
MAY 13...	1200	520	655	--	7.9	11.5	9.0	<6.0	266	K40	5000	74
JUN 03...	1215	411	640	--	7.5	19.5	8.1	1.0	276	K36	K400	80
JUL 15...	1250	647	--	748	7.2	25.5	6.0	<6.0	287	K160	--	76
AUG 05...	1240	137	456	--	7.7	24.5	6.9	2.0	--	--	--	76
SEP 09...	1145	142	124	--	7.5	19.0	11.2	5.0	260	--	--	66

DATE	MAGNE-SIUM, TOTAL RECOVER-ABLE (MG/L) (00921)	SODIUM, TOTAL RECOVER-ABLE (MG/L) (00923)	POTAS-SIUM, TOTAL RECOVER-ABLE (MG/L) (00939)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, TOTAL (MG/L AS N) (00600)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
MAY 13...	37	8.9	5.1	93	9.9	0.230	0.132	0.82	0.95	1.2	0.143
JUN 03...	43	12	5.4	120	12	0.190	0.042	0.95	0.99	1.2	0.108
JUL 15...	42	13	5.5	120	11	0.170	<0.010	1.2	1.2	1.4	0.227
AUG 05...	41	11	4.8	--	--	0.220	<0.010	1.1	1.1	1.4	0.152
SEP 09...	35	9.8	5.4	100	9.4	<0.020	<0.010	1.2	1.2	1.2	0.183

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

05062095 BUFFALO RIVER AT US HIGHWAY 75 IN GEORGETOWN, MN--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORGANIC TOTAL (MG/L AS P) (00670)	ALUMI- NUM, TOTAL RECOVER -ABLE (UG/L) (01104)	ANTI- MONY, TOTAL (UG/L AS SB) (01097)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOVER -ABLE (UG/L) (01009)	BERYL- LIUM TOTAL RECOVER -ABLE (UG/L) (00998)	BORON, TOTAL RECOVER -ABLE (UG/L) (00999)	CADMIUM TOTAL RECOVER -ABLE (UG/L) (01113)	CHRO- MIUM, TOTAL RECOVER -ABLE (UG/L) (01118)	COPPER, TOTAL RECOVER -ABLE (UG/L) (01119)
MAY 13...	0.113	0.14	740	0.7	4	69	<0.2	100	0.05	1	11
JUN 03...	0.061	0.11	1500	<0.2	6	89	<0.2	100	0.06	3	5
JUL 15...	0.144	0.23	1100	<1	8	93	<1	200	<1	2	6
AUG 05...	0.158	0.15	1100	<1	9	84	<1	200	<1	2	5
SEP 09...	0.105	0.18	660	<1	6	63	<1	100	<1	2	4

DATE	IRON, TOTAL RECOVER -ABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOVER -ABLE (UG/L) (01114)	MANGAN- ESE TOTAL RECOVER -ABLE (UG/L) (01123)	NICKEL, TOTAL RECOVER -ABLE (UG/L) (01074)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SILVER, TOTAL RECOVER -ABLE (UG/L) (01079)	THAL- LIUM TOTAL RECOVER -ABLE (UG/L AS TL) (01128)	ZINC, TOTAL RECOVER -ABLE (UG/L) (01094)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. S'ISP. S'VEVE DIAM. % FINER 0.075 MM (71331)
MAY 13...	370	6	80	6	1	0.1	<0.03	6	23	32	67
JUN 03...	2000	3	140	7	3	0.3	<0.03	10	99	110	99
JUL 15...	1800	4	110	7	<1	<1	<1	20	109	190	99
AUG 05...	1700	2	130	7	<1	<1	<1	10	89	33	99
SEP 09...	870	1	100	4	<1	<1	<1	20	65	25	94

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

05320300- COBB RIVER TRIBUTARY NEAR MAPLETON, MN

(Samples Collected Manually)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
MAR									
06...	1030	12	764	7.3	1.0	746	11.7	84	22
12...	1035	77	203	7.2	0.5	741	10.0	71	80
19...	0840	10	622	7.8	1.5	745	11.7	86	330
29...	1440	19	604	7.3	7.5	740	10.8	93	K150
APR									
04...	1545	8.3	720	7.7	7.0	732	11.8	101	92
10...	1250	7.0	792	7.8	3.5	745	11.1	86	120
16...	0900	4.6	769	7.8	2.5	747	12.5	93	130
23...	1245	3.2	743	8.0	10.5	--	18.1	--	48
29...	1045	2.7	752	8.0	11.5	736	15.4	147	60
MAY									
06...	1040	3.0	871	8.0	10.0	746	14.9	135	120
13...	1150	3.3	1030	8.1	9.5	733	17.0	155	30
22...	0845	2.2	790	7.9	10.0	747	15.6	141	340
28...	0800	8.7	749	7.8	8.5	743	10.4	91	140
JUN									
05...	0815	5.7	730	7.6	11.0	734	10.5	100	180
10...	1125	3.5	1030	8.1	15.5	745	15.8	161	60
16...	1130	2.8	957	8.2	17.0	732	16.2	176	160
23...	1100	19	716	7.5	--	739	--	--	1300
24...	1320	12	604	7.7	17.5	735	8.7	94	--
26...	0100	--	796	7.6	--	--	--	--	--
26...	0500	--	759	7.7	--	--	--	--	--
29...	1119	--	335	7.7	--	--	--	--	--
30...	1420	78	736	8.0	20.5	738	7.4	85	--
JUL									
01...	1115	55	507	7.9	20.5	736	7.6	87	--
02...	0910	36	498	7.7	16.5	734	8.4	89	5100
07...	1230	7.6	652	7.8	16.0	741	8.8	91	220
JUL									
13-14	1800	--	202	7.6	--	--	--	--	--
14...	1125	58	501	7.1	18.0	740	--	--	--
16...	0900	13	708	7.5	17.0	739	8.2	88	440
21...	1200	6.6	674	7.7	20.0	742	10.5	119	740
23...	1355	47	545	7.3	--	--	--	--	--
28...	1440	9.8	940	7.1	21.0	748	9.4	108	160
AUG									
05...	0840	3.3	759	7.4	16.5	745	8.1	85	370
12...	0820	2.7	682	7.4	17.5	736	6.7	72	K6200
20...	1145	2.4	779	7.9	18.0	739	14.8	162	540
26...	1120	1.6	804	7.5	19.0	739	9.8	109	K800

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

05320300- COBB RIVER TRIBUTARY NEAR MAPLETON, MN.--continued

(Samples Collected Manually)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	STREP- TOCOCCEI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDEDED (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDEDED (MG/L) (00535)	SEDI- MENT, SU ² - PENDEDED (MG/L) (80154)
MAR									
06...	490	0.340	0.180	8.30	0.280	0.200	2	3	19
12...	K8500	0.930	0.060	3.50	0.690	0.610	132	30	262
19...	K3400	0.310	0.050	8.20	0.200	0.170	11	10	30
29...	760	0.150	0.030	9.10	0.270	0.150	29	6	72
APR									
04...	1100	0.100	0.020	9.60	0.130	0.110	9	6	135
10...	K2100	0.230	0.030	8.50	0.110	0.090	2	12	47
16...	600	--	--	--	--	--	2	6	140
23...	120	0.023	0.040	9.51	0.020	0.023	3	5	--
29...	K27	<0.015	0.061	9.49	0.026	0.020	8	8	107
MAY									
06...	94	<0.015	0.077	9.23	0.014	0.024	<1	2	37
13...	44	0.029	0.060	9.78	0.010	0.015	4	7	66
22...	150	0.040	0.114	8.42	0.019	0.010	6	3	55
28...	460	0.046	0.044	12.5	0.051	0.046	4	5	43
JUN									
05...	320	0.030	0.047	12.1	0.046	0.025	<1	3	18
10...	170	<0.015	0.093	10.5	0.014	0.011	3	5	13
16...	200	<0.015	0.123	10.6	<0.010	0.016	6	2	--
23...	9400	0.026	0.031	14.9	0.089	0.082	30	6	--
24...	--	0.059	0.039	10.6	0.179	0.161	--	--	--
26...	--	<0.015	0.029	13.1	--	0.044	--	--	--
26...	--	0.020	0.029	12.7	--	0.076	--	--	--
29...	--	0.129	0.099	13.1	0.806	0.365	--	--	--
30...	--	0.065	0.079	12.9	0.385	0.302	54	9	--
JUL									
01...	--	0.064	0.114	12.5	0.344	0.280	67	10	--
02...	K900	0.140	0.133	12.0	0.352	0.245	68	11	--
07...	540	--	--	--	--	--	10	4	--
JUL									
13-14	--	0.067	0.035	3.46	0.961	0.392	1750	216	--
14...	--	0.056	0.030	9.35	0.474	0.234	116	18	--
16...	1200	0.057	0.042	12.5	0.141	0.130	18	12	--
21...	K2000	0.021	0.057	5.53	0.315	0.240	12	6	--
23...	--	0.028	0.036	9.49	0.305	0.198	72	24	--
28...	1700	--	--	--	--	--	--	--	--
AUG									
05...	2000	0.031	0.111	10.8	0.070	0.082	12	10	--
12...	8100	0.089	0.147	9.35	0.154	0.100	19	7	--
20...	K820	<0.015	0.088	8.25	0.142	0.101	3	<1	--
26...	2900	0.021	0.069	8.04	0.068	0.060	9	2	--

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

05320300- COBB RIVER TRIBUTARY NEAR MAPLETON, MN.--continued

(Samples Collected By Automatic Sampler)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L ASP) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L ASP) (00671)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDE (MG/L) (00530)	RESIDUE VOL. A- TILE, SUS- PENDE (MG/L) (00535)
MAY 29-30	1135	--	--	0.051	0.064	13.1	0.082	0.072	18	8
JUN 21-23	0634	704	7.0	0.047	0.069	14.3	0.070	0.077	98	14
JUN 24-24	1120	640	7.4	0.075	0.044	16.0	0.190	0.179	128	23
JUN 25-26	1215	747	7.6	<0.015	0.028	13.4	0.057	0.059	--	--
26...	0540	796	7.6	<0.015	0.029	13.1	--	0.044	--	--
26...	0552	759	7.7	0.020	0.029	12.7	--	0.076	--	--
JUN 28-28	1747	296	7.8	0.195	0.069	11.5	1.50	0.404	--	--
JUN 29...	1119	335	7.7	0.129	0.099	13.1	0.806	0.365	--	--
JUN 29-29	1133	324	7.4	0.134	0.051	14.3	0.765	0.356	--	--
JUN 29-29	1547	363	8.2	0.092	0.061	11.9	0.421	0.344	--	--
JUN 30-30	1419	419	8.1	0.051	0.087	11.9	0.512	0.308	88	12
JUL 13-14	2004	202	7.6	0.067	0.035	3.46	0.961	0.392	1750	216
JUL 22-22	0946	212	7.5	0.056	0.021	3.19	0.945	0.338	560	88
JUL 22-23	1720	354	7.2	0.032	0.025	6.30	0.459	0.259	152	40

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

05322000- BLUE EARTH RIVER AT MOUTH AT MANKATO, MN

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L, AS N) (00600)
MAR								
18...	1130	490	7.4	1.0	755	13.1	93	0.300
28...	1220	542	7.4	5.5	733	11.9	98	0.250
APR								
04...	1050	610	8.1	9.0	740	10.9	97	0.050
10...	0915	710	8.2	3.0	750	10.7	81	0.040
16...	1030	655	7.9	6.5	751	11.3	93	--
24...	1030	666	8.3	11.5	748	9.8	93	<0.015
MAY								
01...	0850	687	8.3	10.0	744	11.3	103	<0.015
08...	0940	715	8.2	13.0	743	10.4	101	<0.015
14...	1145	831	8.3	10.0	741	11.8	108	<0.015
21...	1015	983	8.2	15.0	753	13.3	134	<0.015
28...	1000	723	8.2	12.0	747	10.7	101	0.000
JUN								
04...	0900	710	8.1	18.5	746	9.7	106	0.024
10...	0900	690	8.1	20.0	750	9.2	103	<0.015
17...	1115	781	8.2	21.5	741	10.9	128	<0.015
25...	1435	647	8.2	23.5	747	8.4	102	0.041
JUL								
01...	1400	568	7.3	22.0	737	8.7	104	0.038
09...	1030	704	8.2	19.5	748	8.5	94	0.028
15...	101	621	7.3	23.0	742	11.1	133	--
15...	1010	621	7.3	23.0	742	11.1	133	<0.015
22...	1210	510	7.5	23.0	748	10.3	123	0.031
30...	0840	706	7.7	20.5	751	--	--	<0.015
AUG								
04...	1235	739	8.2	26.0	748	8.5	108	0.020
11...	1330	625	8.3	21.5	748	10.6	123	0.055
21...	1120	647	8.3	19.0	749	10.1	111	<0.015
26...	1445	704	8.3	23.5	745	11.2	135	<0.015

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

05322000- BLUE EARTH RIVER AT MOUTH AT MANKATO, MN.--continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
MAR								
18...	0.100	5.80	0.220	0.190	135	19	--	--
28...	0.050	6.80	0.550	0.130	344	34	2.40	<0.100
APR								
04...	0.040	6.70	0.260	0.090	--	--	7.50	0.300
10...	0.030	7.40	0.120	0.070	47	13	3.03	0.220
16...	--	--	--	--	40	18	9.71	0.340
24...	0.016	7.02	0.093	<0.010	43	9	7.81	0.620
MAY								
01...	0.017	6.53	0.128	<0.010	22	10	11.6	0.420
08...	0.017	8.71	0.061	0.017	28	6	10.1	0.370
14...	0.024	8.87	0.029	0.011	33	17	10.4	0.380
21...	0.027	6.64	0.072	<0.010	48	7	3.80	<0.100
28...	0.047	13.1	0.421	0.068	232	42	3.40	<0.100
JUN								
04...	0.023	10.7	0.042	0.028	134	25	13.0	<0.100
10...	0.019	9.18	0.061	0.010	54	10	27.0	0.830
17...	0.023	7.80	0.063	<0.010	38	13	17.0	0.710
25...	0.045	10.9	0.094	0.090	--	--	15.0	0.460
JUL								
01...	0.041	12.3	0.279	0.119	192	23	9.80	0.220
09...	0.016	9.01	0.243	0.050	96	27	12.0	0.350
15...	--	--	--	--	--	--	--	--
15...	0.018	9.91	0.190	0.101	248	46	11.0	E0.380
22...	0.020	7.14	0.352	0.106	824	84	11.0	E0.500
30...	0.013	9.32	0.099	0.085	158	32	8.20	0.380
AUG								
04...	0.016	7.45	0.201	0.071	148	19	21.0	1.00
11...	0.021	4.66	0.214	0.012	98	16	46.0	E2.40
21...	0.020	4.57	0.225	0.033	66	5	14.0	1.40
26...	0.018	5.53	0.138	0.039	56	8	16.0	0.980

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

05330902- NINE MILE CREEK NR JAMES CIRCLE AT BLOOMINGTON, MN

(National Water Quality Assessment Station)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CO ₂ -I- F ₀ F ₀ M, FECAL, 0.7 UM-MF (CO ₂ -S/ 100 ML) (31625)
OCT											
17...	1100	19	324	337	7.9	7.3	14.0	728	8.9	89	--
29...	1225	75	505	630	7.6	7.3	9.5	728	10.8	99	--
NOV											
21...	1020	65	533	557	7.4	7.6	0.5	750	12.8	90	--
DEC											
17...	0935	7.0	1090	1080	7.7	8.0	0.0	--	12.9	--	--
JAN											
21...	0945	6.9	1270	1270	7.8	7.8	1.0	737	12.6	92	--
FEB											
25...	1110	10	1510	1550	8.0	8.0	0.5	746	14.2	101	--
MAR											
11...	1015	18	1480	1480	7.8	7.7	1.5	753	13.1	95	--
21...	1240	31	1090	1100	7.8	7.6	2.5	735	7.6	58	--
27...	1435	--	830	845	7.9	7.8	7.0	734	11.3	97	--
APR											
11...	1150	25	753	768	8.0	7.8	2.5	750	13.6	102	--
17...	1030	14	947	847	8.3	8.0	6.5	--	--	--	--
25...	1047	--	848	863	8.4	8.2	11.5	749	12.6	118	--
MAY											
01...	1100	--	897	909	8.4	8.0	9.5	740	13.4	121	--
09...	1000	20	898	901	8.1	8.0	20.0	752	11.4	101	--
13...	0942	--	871	881	8.2	7.9	9.0	740	11.3	100	--
23...	1200	6.9	864	845	8.6	8.3	16.5	747	8.5	89	--
29...	1112	--	748	696	7.8	7.8	12.0	744	9.1	87	--
JUN											
06...	1050	--	810	812	8.0	7.9	17.0	744	8.9	97	--
12...	1128	4.4	823	800	8.1	8.1	17.4	740	9.5	102	--
19...	1038	10	718	709	7.9	7.5	16.0	738	8.5	89	--
24...	1135	18	359	353	7.6	7.3	23.0	--	6.7	82	--
30...	1040	--	608	583	7.7	7.7	21.0	743	7.4	86	--
JUL											
02...	1045	90	327	315	7.5	7.3	20.5	735	7.2	83	--
08...	1034	55	430	414	7.7	7.5	17.0	744	8.5	91	--
16...	1220	76	464	459	7.6	7.8	25.0	744	6.6	81	--
19...	1055	--	122	127	7.3	7.7	21.5	748	7.7	90	--
22...	1004	--	230	227	7.2	7.5	21.0	748	7.1	82	--
30...	1145	278	420	411	7.5	7.4	22.0	756	7.2	84	--
AUG											
07...	1350	--	533	525	8.0	8.1	23.0	750	8.0	94	--
11...	1237	29	558	550	8.0	7.9	20.0	750	8.7	98	--
19...	0953	--	286	292	7.7	7.9	17.5	748	8.8	95	--
19...	1100	--	--	127	--	7.7	--	--	--	--	--
27...	1230	49	437	431	7.7	7.9	21.5	747	7.7	90	--
SEP											
08...	1120	33	481	456	7.7	8.1	20.0	--	7.6	87	--
30...	1148	10	554	523	8.0	8.1	14.5	744	9.3	94	500

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

05330902- NINE MILE CREEK NR JAMES CIRCLE AT BLOOMINGTON, MN.--continued

(National Water Quality Assessment Station)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML.) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
OCT											
17...	--	100	92	89	112	--	0.040	0.030	0.40	0.80	0.310
29...	--	100	74	82	90	--	0.210	0.060	0.50	2.5	0.330
NOV											
21...	--	140	98	102	120	--	0.130	0.040	0.60	1.2	0.750
DEC											
17...	--	270	223	219	272	--	0.450	0.020	0.80	0.90	0.730
JAN											
21...	--	310	232	239	283	--	0.540	0.020	0.90	1.0	0.540
FEB											
25...	--	330	254	261	310	--	0.640	0.030	1.1	1.2	0.560
MAR											
11...	--	250	180	193	220	--	0.550	0.020	0.90	1.1	0.510
21...	--	200	224	170	273	--	0.460	0.020	0.80	1.3	0.650
27...	--	200	147	152	179	--	0.340	0.020	0.70	1.2	1.10
APR											
11...	--	200	143	153	174	--	0.020	0.010	0.40	0.60	0.680
17...	--	230	168	178	205	--	<0.015	<0.010	0.40	0.60	0.450
25...	--	250	178	191	217	--	<0.015	<0.010	0.30	0.50	0.088
MAY											
01...	--	270	196	200	184	6	<0.015	<0.010	0.42	0.60	0.063
09...	--	270	201	207	245	--	<0.015	<0.010	0.45	0.70	0.092
13...	--	270	194	210	237	--	<0.015	<0.010	0.29	0.60	0.122
23...	--	280	196	208	239	11	<0.015	<0.010	0.41	0.40	0.088
29...	--	220	160	169	195	--	0.142	0.037	0.68	0.80	0.926
JUN											
06...	--	250	183	189	223	--	0.022	0.031	0.59	0.50	0.375
12...	--	240	182	190	222	--	0.030	0.033	0.38	0.60	0.308
19...	--	240	238	174	290	--	0.107	0.037	0.69	0.90	0.456
24...	--	85	62	69	76	--	0.196	0.048	0.63	1.5	0.383
30...	--	170	124	128	151	--	0.088	0.015	0.70	1.1	0.110
JUL											
02...	--	83	73	73	89	--	0.087	0.017	0.56	0.90	0.157
08...	--	120	104	106	127	--	--	--	--	--	--
16...	--	130	113	116	138	--	<0.015	<0.010	0.62	0.70	<0.050
19...	--	35	32	46	39	--	0.176	0.012	0.43	2.1	0.223
22...	--	71	68	69	83	--	<0.015	0.014	0.64	0.40	0.106
30...	--	140	115	129	140	--	0.042	<0.010	0.70	1.2	<0.050
AUG											
07...	--	180	141	153	172	--	<0.015	0.010	0.65	0.70	0.106
11...	--	180	157	162	192	--	0.022	0.011	0.48	0.70	0.116
19...	--	98	72	83	88	--	0.147	0.025	0.49	0.60	0.257
19...	--	41	30	42	37	--	0.238	0.017	0.40	2.0	0.320
27...	--	150	122	137	149	--	<0.015	0.019	0.53	0.60	0.168
SEP											
08...	--	170	138	150	168	--	0.066	0.023	0.58	0.70	0.158
30...	2900	200	--	171	--	--	0.052	0.025	0.46	0.40	0.301

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

05330902- NINE MILE CREEK NR JAMES CIRCLE AT BLOOMINGTON, MN.--continued

(National Water Quality Assessment Station)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)
OCT										
17...	0.060	0.010	<0.010	7.2	2.0	25	10	20	0.9	3.5
29...	0.450	0.070	0.060	4.8	>5.0	26	8.7	79	3	2.7
NOV										
21...	0.080	0.040	0.040	5.8	0.60	35	12	52	2	3.7
DEC										
17...	0.040	0.020	0.010	5.5	0.40	67	24	100	3	4.0
JAN										
21...	0.020	0.020	0.010	5.5	0.30	80	27	140	3	4.4
FEB										
25...	0.030	<0.010	0.010	5.1	0.50	84	29	180	4	4.9
MAR										
11...	0.050	<0.010	0.020	5.6	0.70	65	21	190	5	4.7
21...	0.150	0.040	0.050	5.5	2.5	51	17	120	4	3.8
27...	0.130	<0.010	0.020	5.4	1.3	54	16	87	3	3.1
APR										
11...	0.070	0.040	<0.010	6.0	0.10	52	17	69	2	2.8
17...	0.040	0.010	<0.010	5.9	1.7	58	20	71	2	3.1
25...	0.021	<0.010	<0.010	5.9	1.0	61	23	70	2	3.1
MAY										
01...	0.024	0.013	<0.010	6.2	0.40	65	25	78	2	3.6
09...	0.065	<0.010	<0.010	6.5	2.0	63	26	72	2	3.8
13...	0.087	<0.010	<0.010	6.4	0.60	65	26	68	2	3.6
23...	0.024	<0.010	<0.010	6.2	0.40	68	27	66	2	3.0
29...	0.041	<0.010	0.013	9.4	0.20	53	22	57	2	3.0
JUN										
06...	0.030	0.028	0.038	6.9	0.40	56	25	63	2	3.0
12...	--	--	--	--	--	--	--	--	--	--
19...	0.114	0.042	0.046	9.1	0.60	54	24	55	2	3.1
24...	0.271	0.071	0.067	7.5	3.4	20	8.6	33	2	2.1
30...	0.146	0.062	0.051	10	0.70	36	19	54	2	3.3
JUL										
02...	0.155	0.053	0.044	7.8	1.9	20	7.9	26	1	2.0
08...	--	--	--	9.4	1.0	32	11	35	1	2.4
16...	0.124	0.085	0.063	8.7	1.5	33	12	37	1	2.3
19...	0.447	0.037	0.047	3.6	>5.0	10	2.4	8.1	0.6	1.0
22...	0.042	0.086	0.038	6.0	2.3	20	5.3	15	0.8	1.8
30...	0.204	0.084	0.057	8.5	0.40	37	11	28	1	2.7
AUG										
07...	0.097	0.032	0.039	8.2	1.4	47	15	36	1	2.8
11...	0.065	0.034	0.042	7.8	0.40	45	17	40	1	2.5
19...	0.074	0.042	0.039	4.4	2.0	25	8.6	18	0.8	1.7
19...	0.203	0.017	0.023	2.5	0.80	11	3.4	7.2	0.5	0.92
27...	0.109	0.064	0.035	6.6	1.0	40	12	26	0.9	2.2
SEP										
08...	0.073	0.033	0.036	6.4	0.40	43	14	30	1	2.6
30...	0.036	0.023	0.026	6.1	0.30	51	17	33	1	2.8

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

05330902- NINE MILE CREEK NR JAMES CIRCLE AT BLOOMINGTON, MN.--continued

(National Water Quality Assessment Station)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE (	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
17...	39	11	0.20	4.3	57	56	192	170	11	82
29...	130	13	0.10	4.3	50	61	334	310	177	93
NOV										
21...	88	20	0.20	6.2	50	34	296	280	17	89
DEC										
17...	190	34	0.20	14	23	120	612	571	16	70
JAN										
21...	240	32	0.20	16	34	210	715	682	48	75
FEB										
25...	330	30	0.30	17	13	180	841	831	78	21
MAR										
11...	330	26	0.30	12	24	200	794	760	13	95
21...	230	25	0.20	9.0	21	120	599	594	62	94
27...	160	27	0.20	8.7	20	110	456	450	42	89
APR										
11...	130	28	0.15	6.9	35	63	418	391	6	92
17...	140	32	0.21	5.4	67	102	524	435	30	60
25...	150	34	0.23	2.9	57	104	510	447	26	85
MAY										
01...	150	36	0.21	3.2	100	127	517	461	34	82
09...	140	39	0.25	4.2	28	50	529	471	25	91
13...	140	35	0.27	5.4	56	86	530	459	12	82
23...	130	32	0.26	5.7	24	49	540	464	10	70
29...	110	30	0.28	6.1	38	26	424	383	2	92
JUN										
06...	130	28	0.26	8.2	41	48	490	423	2	92
12...	130	26	0.24	8.3	77	51	493	423	--	--
19...	110	23	0.28	8.8	32	43	410	420	25	93
24...	60	10	0.15	3.0	41	22	206	176	116	99
30...	100	15	0.23	6.0	130	48	368	310	23	86
JUL										
02...	47	5.9	0.13	4.3	130	45	194	159	30	91
08...	62	8.1	0.14	7.2	130	47	246	220	12	90
16...	67	8.9	0.14	6.4	160	150	278	235	23	77
19...	13	2.1	<0.10	2.1	120	70	72	60	532	52
22...	25	4.3	<0.10	5.6	180	88	137	119	324	29
30...	46	8.2	0.11	10	390	282	254	213	31	79
AUG										
07...	66	11	0.17	7.2	72	91	317	271	9	83
11...	66	11	0.19	7.0	52	70	322	284	82	92
19...	33	6.8	0.10	4.5	28	41	174	142	20	91
19...	12	3.7	<0.10	1.7	15	60	73	60	282	38
27...	46	8.0	0.14	7.8	67	89	259	216	--	--
SEP										
08...	54	10	0.16	8.8	48	50	279	246	6	82
30...	67	16	0.17	11	35	65	321	301	--	--

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS

06483000- ROCK RIVER AT LUVERNE, MN

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DI- SOLVED (MG/L AS SO4) (00945)
NOV												
13...	0800	--	890	8.1	0.0	--	13.6	--	0.050	6.90	20	99
MAR												
24...	1200	2060	288	7.8	0.0	720	--	--	0.070	2.10	--	--
APR												
07...	1700	--	442	7.9	1.0	--	12.0	--	0.050	4.40	--	--
MAY												
20...	1030	216	681	8.3	11.5	--	10.9	--	0.052	4.97	--	--
JUN												
03...	1015	--	676	7.7	18.0	--	8.9	--	0.058	4.65	--	--
30...	0945	--	339	7.5	19.0	726	5.5	62	0.136	7.11	--	--
JUL												
23...	0730	--	659	8.0	24.0	728	6.4	80	0.033	4.24	--	--
AUG												
28...	1740	--	628	8.4	23.5	726	9.1	113	0.050	2.43	--	--

**Water Quality
of
Miscellaneous Sites**

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES

Samples are collected at sites other than gaging stations and partial-record stations to give better areal coverage. Such stations are referred to as miscellaneous stations. Letter E indicates estimated value. Letter K indicates non-ideal colony count.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05268000- PLATTE RIVER AT ROYALTON, MN

(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, (PER- CENT SATUR- ATION) (00301)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
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APR 04...	1610	3310	92	6.9	1.5	733	9.9	73	33	40
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DATE	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
------	--	--	--	---	--	---	--	--	--	--

APR 04...	0.530	0.010	1.3	1.6	0.420	0.190	0.080	0.060	50	38
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05278400- NORTH FORK CROW RIVER NEAR ROCKFORD, MN

(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, (PER- CENT SATUR- ATION) (00301)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
------	------	---	--	--	---	---	--	---	--	--

MAR 31...	1602	1260	398	7.4	2.5	740	10.1	76	136	166
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DATE	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
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MAR 31...	0.570	0.070	1.3	1.6	3.50	0.320	0.180	0.160	52	92
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ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05278590- SOUTH FORK CROW RIVER AT BISCA Y, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, (PER- CENT SATUR- ATION) (MG/L) (00300)	OXYGEN, (PER- CENT SATUR- ATION) (MG/L) (00301)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER D'S IT FIELD MG/L AS HCO3 (07453)
MAR 27...	1325	282	635	7.5	3.5	725	11.2	88	212	259
DATE		NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHOS, DIS- SOLVED (MG/L AS P) (00671)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAR 27...		0.920	0.070	1.8	2.4	5.30	0.570	0.360	0.330	132 35

05278930- BUFFALO CREEK NEAR GLENCOE, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, (PER- CENT SATUR- ATION) (MG/L) (00300)	OXYGEN, (PER- CENT SATUR- ATION) (MG/L) (00301)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER D'S IT FIELD MG/L AS HCO3 (07453)
MAR 31...	1145	1660	338	7.3	1.5	740	10.3	75	114	139
DATE		NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHOS, DIS- SOLVED (MG/L AS P) (00671)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAR 31...		0.330	0.090	0.80	1.1	4.90	0.360	0.270	0.250	26 61

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05286798- FORD BROOK ON GREEN VALLEY ROAD IN RAMSEY, MN
(National Water-Quality Assessment Station)

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS/ 100 ML) (31625)
SEP 16...	1030	438	423	7.7	8.0	17.5	735	7.2	79	370
DATE	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)
	SEP 16...	960	210	200	0.039	0.020	0.95	0.89	0.378	0.070	0.042
DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	
	SEP 16...	0.038	12	0.50	53	19	7.3	0.2	2.3	16
DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	
	SEP 16...	9.3	0.13	13	120	115	281	242	10	94

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05288475- COON CREEK AT 131 STREET IN COON RAPIDS, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND-ARD UNITS) (00403)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)
SEP 25...	1240	26	519	509	7.9	8.0	13.5	740	9.5	94
DATE	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
	SEP 25...	100	580	240	200	0.128	0.037	0.50	0.66	0.777	0.045
DATE	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)
	SEP 25...	0.030	0.015	7.4	0.20	72	16	12	0.3	2.1	24
DATE	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. 9+ FINER THAN .062 MM (70331)	
	SEP 25...	37	0.14	21	91	135	319	307	7	71

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05288487- SAND CREEK AT XEON STREET IN COON RAPIDS, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (00095)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND-ARD UNITS) (00403)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	
SEP 26...	1130	7.3	689	641	7.9	7.7	12.5	742	9.6	93	
DATE	TIME	COLI-FORM, FECAL, 0.7 UM-MF (COLS/100 ML) (31625)	STREP-TOCOCCHI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
SEP 26...	K240		760	310	227	0.028	0.022	0.62	0.76	1.37	0.038
DATE	TIME	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)
SEP 26...		<0.010	0.012	9.6	0.20	94	18	21	0.5	2.6	40
DATE	TIME	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	
SEP 26...	73		0.15	19	35	156	448	409	22	94	

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05288598- RICE CREEK AT CENTRAL AVE. IN FRIDLEY, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT- ANCE	SPE-CIFIC CON-DUCT- ANCE	PH WATER WHOLE FIELD (STAND- ARD UNITS)	PH WATER WHOLE LAB (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, (PER- CENT SATUR- ATION)
		(00061)	(US/CM) (00095)	(US/CM) (90095)	(00400)	(00403)	(00010)	(00025)	(00300)	(00301)
SEP 15...	1130	64	398	384	7.9	8.0	20.5	744	6.8	78
DATE	COLI- FORM, FECAL, 0.7 UM-MF (COLS/ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LINEITY LAB AS CACO3) (90410)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)
SEP 15...	220	K31000	140	121	0.061	<0.010	1.0	2.1	<0.050	0.120
DATE	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTH- DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDE TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
SEP 15...	0.017	<0.010	13	2.2	37	12	23	0.8	2.5	43
DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	
SEP 15...	11	0.11	3.2	65	4.4	227	205	50	94	

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05288700- SHINGLE CREEK AT BROOKLYN CENTER, MN
(National Water-Quality Assessment Station)

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE	SPE- CIFIC CON- DUCT- ANCE	PH WATER WHOLE FIELD	PH WATER WHOLE LAB	TEMPER- ATURE WATER	BARO- METRIC PRES- SURE	OXYGEN, DIS- SOLVED	OXYGEN, DIS- SOLVED	HARD- NESS TOTAL
		(US/CM) (00095)	(US/CM) (90095)	(STAND- ARD UNITS) (00400)	(STAND- ARD UNITS) (00403)		(MM OF HG) (00025)	(MG/L) (00300)	(PER- CENT SATUR- ATION) (00301)	(MG/L AS CACO3) (00900)
JUL 15...	1234	489	462	7.4	7.6	24.0	742	4.6	57	170
DATE	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3	ALKA- LITY LAB (MG/L AS CACO3)	BICAR- BONATE WATER DIS I FIELD MG/L AS HCO	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	PHOS- PHORUS TOTAL (MG/L AS P)	
	(39086)	(90410)	(00453)	(00608)	(00613)	(00623)	(00625)	(00631)	(00665)	
JUL 15...	116	123	142	0.051	0.022	0.57	1.2	0.137	0.159	
DATE	PHOS- PHORUS DIS- SOLVED (MG/L AS P)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C)	CARBON, ORGANIC SUS- PENDE TOTAL (MG/L AS C)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)
	(00666)	(00671)	(00681)	(00689)	(00915)	(00925)	(00930)	(00931)	(00935)	(00940)
JUL 15...	0.010	0.023	8.8	3.9	52	11	28	0.9	2.5	53
DATE	SULFATE DIS- SOLVED (MG/L AS SO4)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SIO2)	IRON, DIS- SOLVED (UG/L AS FE)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SEDI- MENT, SUS- PENDE (MG/L)	SED. SUSP. SIEVE DIAM. % FINER THAN	
	(00945)	(00950)	(00955)	(01046)	(01056)	(70300)	(70301)	(80154)	.062 MM (70331)	
JUL 15...	28	0.11	11	88	560	314	256	39	92	

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05288839- BASSETT CK AT DRESDEN LANE IN GOLDEN VALLEY, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND-ARD UNITS) (00403)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	
SEP 15...	1405	13	786	736	8.0	8.0	19.0	743	6.3	70	
DATE	TIME	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEI [†] NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
SEP 15...	800	K9000	270	218	0.040	0.013	0.50	0.59	0.316	0.067	
DATE	TIME	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM [†] DIS-SOLVED (MG/L AS K) (00935)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)
SEP 15...	0.033	0.042	5.9	0.40	71	23	47	1	3.9	110	
DATE	TIME	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SED*-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	
SEP 15...	29	0.22	10	63	70	463	424	17	87		

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05289600- MINNEHAHA CREEK AT NICOLLET AVE. IN MINNEAPOLIS
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND-ARD UNITS) (00403)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	
SEP 24...	1000	112	448	438	8.0	8.2	15.0	747	8.7	89	
DATE	TIME	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
SEP 24...	290		1800	160	142	0.017	<0.010	0.58	0.70	0.084	0.023
DATE	TIME	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)
SEP 24...	0.019		<0.010	7.5	0.70	37	17	26	0.9	3.9	52
DATE	TIME	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	
SEP 24...	5.1		0.15	3.7	35	7.9	247	231	9	87	

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05303900- SHAKOPEE CREEK NEAR LOURISTON, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD) (UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
AUG 11...	1700	105	512	8.1	22.5	7.1	84	208	254	<0.015	0.021
DATE		NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (MG/L) (80154)	CHLOR-A PHYTO-PLANK-TON CHROMO FLUOROM (UG/L) (70953)
AUG 11...	0.94	1.9	0.680	0.357	0.067	0.071	11	2.5	113	95	4.20

05304795- DRY WEATHER CREEK NEAR WATSON, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD) (UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
AUG 12...	0845	6.7	1500	7.6	19.5	8.3	93	263	321	0.029	0.014
DATE		NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (MG/L) (80154)	CHLOR-A PHYTO-PLANK-TON CHROMO FLUOROM (UG/L) (70953)
AUG 12...	0.53	1.0	0.207	0.085	<0.010	<0.010	6.2	1.6	178	94	8.30

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05312000- SPRING CREEK NEAR SPRING CREEK, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
AUG 12...	1330	14	1750	8.0	22.0	11.7	136	324	395	<0.015	0.074

DATE	NITRO- GEN,AM- MONIA + ORGANIC DIS.	NITRO- GEN,AM- MONIA + ORGANIC TOTAL	NITRO- GEN, NO2+NO3 DIS- SOLVED	PHOS- PHORUS TOTAL	PHOS- PHORUS DIS- SOLVED	PHOS- PHORUS ORTHO, DIS- SOLVED	CARBON, ORGANIC DIS- SOLVED	CARBON, ORGANIC SUS- PENDED TOTAL	SEDI- MENT, SUS- PENDED	SED. SUSP. SIEVE DIAM. % FINER THAN	CHLOR-A PHYTO- PLANK- TON CHLOROM FLUOROM
	(MG/L AS N)	(MG/L AS N)	(MG/L AS N)	(MG/L AS P)	(MG/L AS P)	(MG/L AS P)	(MG/L AS C)	(MG/L AS C)	(MG/L)	.062 MM	(UG/L)
	(00623)	(00625)	(00631)	(00665)	(00666)	(00671)	(00681)	(00689)	(80154)	(70331)	(70953)
AUG 12...	0.91	1.5	0.968	0.177	0.136	0.128	8.9	0.60	117	57	7.09

05314500- HAWK CREEK NEAR MAYNARD, MINN.
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR-BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)
AUG 11...	1155	81	959	8.3	20.5	741	9.5	109	291	338	8	0.015

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	CHLOR-A PHYTO- PLANK- TON CHLORO FLUORO (UG/L) (70953)	
	AUG												
	11...	0.035	0.64	1.9	3.80	0.441	0.214	0.231	8.5	>5.0	75	91	21.0

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05314510- CHETOMBA CREEK NEAR RENVILLE, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	
AUG 25...	1115	28	1360	8.1	21.5	9.2	109	350	427	<0.015	
DATE		NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
AUG 25...	0.049	0.73	0.95	12.7	0.096	0.078	0.064	5.9	0.60	86	77

05316985- SLEEPY EYE CREEK NEAR SPRINGFIELD, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CAC03 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	
AUG 13...	1400	89	1060	8.0	22.5	745	10.5	123	354	432	0.017	
DATE		NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	SED. SUSP. SIEVE DIAM. % FINE THAN .062 MM (70331)	CHLOR-A PHYTO-PLANK-TON CHROMO (UG/L) (70953)
AUG 13...	0.032	0.52	0.70	10.1	0.055	0.035	0.044	4.3	0.60	53	82	4.90

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05317170- LITTLE COTTONWOOD RIVER NEAR SEARLES, MN

(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR-BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)
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AUG 13...	0830	49	785	8.2	19.0	745	8.9	97	269	321	4	<0.015
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DATE	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	CHLOR-A PHYTO-PLANK-TON CHROMO FLUOROM (UG/L) (70753)
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AUG 13...	0.018	0.50	0.59	4.56	0.111	0.071	0.086	4.2	0.90	111	85	2.20
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05317800- WEST BRANCH BLUE EARTH RIVER ABOVE ELMORE, MN

(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
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AUG 20...	1145	26	746	8.1	20.0	10.3	115	294	358	0.019	0.048
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DATE	NITRO-GEN, AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	CHLOR-A PHYTO-PLANK-TON CHROMO FLUOROM (UG/L) (70753)
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AUG 20...	0.46	0.90	3.18	0.061	0.015	0.022	4.9	0.70	65	84	7.60
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ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05317828- COON CREEK AT U.S. HWY. 169 NEAR BLUE EARTH, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, (PER- CENT SATUR- ATION) (00301)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
AUG 20...	1445	21	645	8.1	19.0	8.9	99	264	322	<0.015	0.036
DATE	TIME	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDE TOTAL (MG/L AS C) (00689)	SED. SUSP. SIEVE DIAM. % FINER THAN (MG/L) .062 MM (70331)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)
AUG 20...	0.31	0.58	6.38	0.059	0.028	0.043	3.7	0.50	53	71	1.40

05318050- EAST BRANCH BLUE EARTH RIVER BELOW BRICELYN, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, (PER- CENT SATUR- ATION) (00301)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
AUG 20...	0830	47	594	8.1	18.5	8.2	90	268	327	0.084	0.043
DATE	TIME	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDE TOTAL (MG/L AS C) (00689)	SED. SUSP. SIEVE DIAM. % FINER THAN (MG/L) .062 MM (70331)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)
AUG 20...	0.58	1.1	3.25	0.126	0.051	0.054	5.3	1.5	81	86	13.0

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05318138- SOUTH CREEK NEAR HUNTLEY, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (PER-CENT FIELD) (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT FIELD) (MG/L) (00300)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00008)	
AUG 14...	0900	12	433	8.1	19.5	729	8.6	95	157	192	0.785	
DATE		NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00665)	PHOS-PHORUS ORTHO-DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	SED. SUSP. SIEVE DIAM. % FINER THAN (MG/L) (80154)	CHLOR-A PHYTO-PLANK-TON CHROMO-FLUOROM (70053)	
AUG 14...	0100	2.3	3.7	0.620	0.194	0.033	0.027	11	1.7	30	75	22.0

05318178- CENTER CREEK AT HUNTLEY, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, (PER-CENT FIELD SATUR-ATION)	ALKA-LINITY WAT DIS TOT IT FIELD	BICAR-BONATE WATER DIS IT FIELD	CAR-BONATE WATER DIS IT FIELD	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	
		(00061)	(00095)	(00400)	(00010)	(00025)	(00300)	(00301)	(39086)	(00453)	(00452)	(00408)	
		AUG 14...	1230	10	616	8.7	20.5	729	12.7	145	199	218	<0.015
DATE	TIME	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS DIS-SOLVED (MG/L AS P)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (MG/L)	CHLOR-A PH'TO-PLANK-TON CHROMO FLUOROM (70053)		
		(00613)	(00623)	(00625)	(00631)	(00665)	(00666)	(00671)	(00681)	(00689)	(80154)	(70331)	
		AUG 14...	0.025	0.58	1.5	2.31	0.227	0.104	0.109	5.6	3.2	18	93

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05318240- ELM CREEK NEAR NORTHROP, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	
AUG 14...	1545	24	591	8.2	21.0	726	8.5	97	219	267	0.027	
DATE		NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	SED. SUSP. SIEVE DIAM. % FINE ² THAN .062 MM (MG/L) (80154)	CHLOR-A PHYTO-PLANK-TON CHROMO FLUOROM (UG/L) (70953)
AUG 14...	0043	0.64	1.6	2.09	0.130	<0.010	0.011	5.8	1.6	72	86	12.0

05318630- WATONWAN RIVER NEAR ST. JAMES, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)		
AUG 15...	0730	33	824	8.1	18.5	724	8.6	93	268	327	<0.015		
DATE		NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	SED. SUSP. SIEVE DIAM. % FINE ² THAN .062 MM (MG/L) (80154)	CHLOR-A PHYTO-PLANK-TON CHROMO FLUOROM (UG/L) (70953)	
AUG 15...	0018	0.018	0.38	0.69	5.70	0.090	0.026	0.035	3.8	1.5	114	87	7.70

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05318800- ST. JAMES CREEK NEAR LA SALLE, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
AUG 21...	0815	63	806	7.6	16.5	8.2	87	255	311	0.037	0.032

DATE	NITRO- GEN,AM- MONIA + ORGANIC DIS.	NITRO- GEN,AM- MONIA + ORGANIC TOTAL	NITRO- GEN, NO2+NO3 DIS- SOLVED	PHOS- PHORUS TOTAL	PHOS- PHORUS DIS- SOLVED	PHOS- PHORUS ORTHO, DIS- SOLVED	CARBON, ORGANIC DIS- SOLVED	CARBON, ORGANIC SUS- PENDED TOTAL	SEDI- MENT, SUS- PENDED	SED. SUSP. SIEVE DIAM. % FINER THAN	CHLOR-A PHYTO PLANK- TON CHLOROMO
	(MG/L AS N)	(MG/L AS N)	(MG/L AS N)	(MG/L AS P)	(MG/L AS P)	(MG/L AS P)	(MG/L AS C)	(MG/L AS C)	(MG/L)	.062 MM	(UG/L)
	(00623)	(00625)	(00631)	(00665)	(00666)	(00671)	(00681)	(00689)	(80154)	(70331)	(70953)
AUG 21...	0.50	1.4	8.15	0.440	0.269	0.283	4.8	2.7	135	97	6.50

05319050- SOUTH FORK WATONWAN RIVER NEAR ST. JAMES, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
AUG 19...	1545	28	735	8.2	19.0	10.2	112	232	284	<0.015	0.014

DATE	NITRO- GEN,AM- MONIA + ORGANIC DIS.	NITRO- GEN,AM- MONIA + ORGANIC TOTAL	NITRO- GEN, NO2+NO3 DIS- SOLVED	PHOS- PHORUS TOTAL	PHOS- PHORUS DIS- SOLVED	PHOS- PHORUS ORTHO, DIS- SOLVED	CARBON, ORGANIC DIS- SOLVED	CARBON, ORGANIC SUS- PENDED TOTAL	SEDI- MENT, SUS- PENDED	SED. SUSP. SIEVE DIAM. % FINER THAN	CHLOR-A PHYTO PLANK- TON CHROMO FLUCROM
	(MG/L AS N)	(MG/L AS N)	(MG/L AS N)	(MG/L AS P)	(MG/L AS P)	(MG/L AS P)	(MG/L AS C)	(MG/L AS C)	(MG/L)	.062 MM	(UG/L)
	(00623)	(00625)	(00631)	(00665)	(00666)	(00671)	(00681)	(00689)	(80154)	(70331)	(70953)
AUG 19...	0.57	1.7	1.64	0.119	<0.010	<0.010	4.3	4.0	150	96	38.0

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05319360- PERCH CREEK BELOW VERNON CENTER, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR-BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, DIS-SOLVED (MG/L AS N) (00613)
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AUG 19...	1300	22	758	8.4	19.0	12.9	142	300	346	10	<0.015	0.023
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DATE	NITRO-GEN,AM-MONIA + ORGANIC DIS- (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO-DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	SED-I-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	CHLOR-A PHYTO-PLANK-TON CHROMO FLUOROM (UG/L) (70953)
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AUG 19...	0.50	0.89	7.60	0.082	0.045	0.050	4.6	0.50	43	56	4.20
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05320080- LE SUEUR RIVER NEAR WILTON, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)
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AUG 18...	1115	230	714	8.1	17.5	745	9.0	95	302	368	0.020
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DATE	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN,AM-MONIA + ORGANIC DIS- (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO-DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	SED-I-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	CHLOR-A PHYTO-PLANK-TON CHROMO FLUOROM (UG/L) (70953)
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AUG 18...	0.023	0.70	1.1	10.4	0.139	0.089	0.090	6.6	0.70	153	86	1.70
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ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05320230- COBB RIVER NEAR MAPLETON, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00408)
AUG 20...	1112	48	675	8.2	18.5	738	8.5	94	253	309	<0.015

DATE	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	CHLOROPHYTO-PLANKTON CHLOROPHYTOM (UG/L) (70953)
AUG 20...	0.032	0.29	1.4	9.55	0.168	0.034	0.027	5.3	1.0	199	95	17.0

05320450- MAPLE RIVER NEAR STERLING CENTER, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00408)
AUG 19...	0900	50	657	8.1	18.5	737	8.2	90	242	295	<0.015

DATE	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	CHLOROPHYTO-PLANKTON CHLOROPHYTOM (UG/L) (70953)
AUG 19...	0.019	0.53	1.2	2.62	0.163	0.064	0.073	5.6	1.4	138	88	17.0

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05326150- MIDDLE BRANCH RUSH RIVER NEAR NEW ROME, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
AUG 28...	1530	97	751	8.0	25.5	738	7.6	95	244	298	<0.015
DATE	TIME	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + NO2+NO3 DIS- SOLVED (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS P) (00631)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00665)	PHOS- PHORUS ORTH, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDE TOTAL (MG/L AS C) (00689)	SED. SUSP. SIEVE DIAM. % FINER THAN (0.062 MM) (70331)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)
AUG 28...	0.081	0.80	1.3	8.58	0.403	0.270	0.242	6.9	0.80	12	3.70

05326250- SOUTH BRANCH RUSH RIVER NEAR RUSH RIVER, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
AUG 21...	1310	238	781	7.6	17.5	8.3	90	296	361	0.017	0.044
DATE	TIME	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00665)	PHOS- PHORUS ORTH, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDE TOTAL (MG/L AS C) (00689)	SED. SUSP. SIEVE DIAM. % FINER THAN (0.062 MM) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN (70331)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)
AUG 21...	0.75	1.1	12.3	0.235	0.156	0.150	7.1	0.50	132	76	1.40

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05326700- HIGH ISLAND CREEK NEAR ARLINGTON, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO-GEN, AMONIA DIS-SOLVED (MG/L AS N) (00608)		
		AUG 28...	1115	192	698	7.7	22.5	738	5.8	69	208	254	<0.015
DATE		NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN,AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	CHLOR-A PHYTO-PLANK-TON FLUOROM (UG/L) (70953)	
AUG 28...	<0.010	0.25	1.2	0.644	0.156	0.010	<0.010	9.5	2.1	128	86	9.80	

05330702- MINNESOTA R. TRIB. ON BEECH ST. IN CHASKA, MN
(National Water-Quality Assessment Station)

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE	SPE- CIFIC CON- DUCT- ANCE	PH WATER WHOLE FIELD (STAND- ARD UNITS)	PH WATER WHOLE LAB (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS/ 100 ML) (31625)		
		(US/CM) (00095)	(US/CM) (90095)	(00400)	(00403)		(00025)	(00301)	(31625)			
SEP 26...	0848	587	550	7.9	8.0	14.5	746	9.0	90	200		
DATE	TIME	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	NITRO- HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	
SEP 26...	2800	2800	250	215	0.021	0.015	0.68	1.1	0.259	0.110	0.040	

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05330702- MINNESOTA R. TRIB. ON BEECH ST. IN CHASKA, MN--Continued
(National Water-Quality Assessment Station)

DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
SEP 26...	0.037	8.9	0.70	62	23	21	0.6	4.4	43
DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. FUSP. SIEVE 1"AM. % FINER THAN .075 MM (70331)
SEP 26...	29	0.17	17	30	122	365	331	9	91

05330750- RILEY CREEK AT EDEN PRAIRIE, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON- DUCT- ANCE LAB (US/CM) (00095)	SPE-CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
SEP 25...	0849	9.9	460	455	7.9	7.9	15.5	743	8.4	87
DATE	COLI- FORM, FECAL, 0.7 UM-MF (COLS/ 100 ML) (31625)	STREP- TOCOCCEI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)
SEP 25...	150	1700	160	137	0.047	0.062	0.56	0.99	0.467	0.051

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05330750- RILEY CREEK AT EDEN PRAIRIE, MN--Continued
(National Water-Quality Assessment Station)

DATE	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	
	SEP 25...	<0.010	0.016	7.8	0.60	39	16	27	0.9	3.9	59
	DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 M (70331)	
	SEP 25...	8.0	0.12	5.9	13	45	262	243	36	80	

05330801- PURGATORY CREEK ON PIONEER TR. IN EDEN PRAIRIE, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, (PER- CENT SATUR- ATION) (00301)
SEP 25...	0940	41	461	455	7.9	8.0	16.5	740	8.7	91
DATE	COLI- FORM, FECAL, 0.7 UM-MF (COLS/ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS- (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)
SEP 25...	100	2900	190	171	0.028	<0.010	0.62	1.3	<0.050	0.078

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05330801- PURGATORY CREEK ON PIONEER TR. IN EDEN PRAIRIE, MN--Continued
(National Water-Quality Assessment Station)

DATE	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDE TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	
	SEP 25...	<0.010	<0.010	8.8	1.2	50	16	20	0.6	3.1	40
	DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SEDIMENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE #100 % FINER THAN 0.075 MM (70331)	
	SEP 25...	9.1	0.13	8.7	42	35	275	249	18	80	

05331050- BATTLE CREEK BELOW MCKNIGHT ROAD IN ST. PAUL, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON- DUCT- ANCE LAB (US/CM) (00095)	SPE-CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)		
		SEP 29...	0950	2.6	498	485	7.4	7.7	16.0	725	7.0	75
		DATE	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS- (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)
		SEP 29...	K11000	1600	130	98	0.121	0.023	0.61	0.82	0.289	0.063

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES
WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05331050- BATTLE CREEK BELOW MCKNIGHT ROAD IN ST. PAUL, MN--Continued
(National Water-Quality Assessment Station)

DATE	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTH- DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
SEP 29...	0.014	0.024	7.2	0.40	34	12	44	2	2.0	87
DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	
SEP 29...	7.9	0.13	4.0	72	80	286	250	7	100	

05335170- CROOKED CREEK NEAR HINCKLEY, MN
(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (MG/L) (00301)	ALKA- LITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	
APR 03...	1434	862	48	6.7	1.5	738	11.8	87	20	24	
DATE	A	NITRO- GEN, MMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	
APR 03...	0.070	<0.010	0.50	0.90	0.200	0.110	0.030	0.010	160	36	

ANALYSES OF SAMPLES COLLECTED AT MISCELLANEOUS SITES

WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

05341540- BROWNS CREEK AT STILLWATER, MN

(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATURATION) (00301)	ALKALINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICARBONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
MAR 26...	1432	20	301	8.0	5.5	740	12.2	100	111	135
DATE		NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, AMMONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN, AMMONIA + NO2+NO3 TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAR 26...	0.180	<0.010	0.40	1.0	0.580	0.200	0.020	0.020	58	85

453049092512101 - SUNRISE RIVER AT SUNRISE, MN

(National Water-Quality Assessment Station)

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	BAROMETRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATURATION) (00301)	ALKALINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICARBONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
MAR 31...	1210	968	194	7.0	2.5	743	12.0	90	73	89
DATE		NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, AMMONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN, AMMONIA + NO2+NO3 TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAR 31...	0.480	0.010	0.90	1.2	1.00	0.200	0.050	0.040	105	42

Ground-Water Wells by County



Ground-Water
Levels

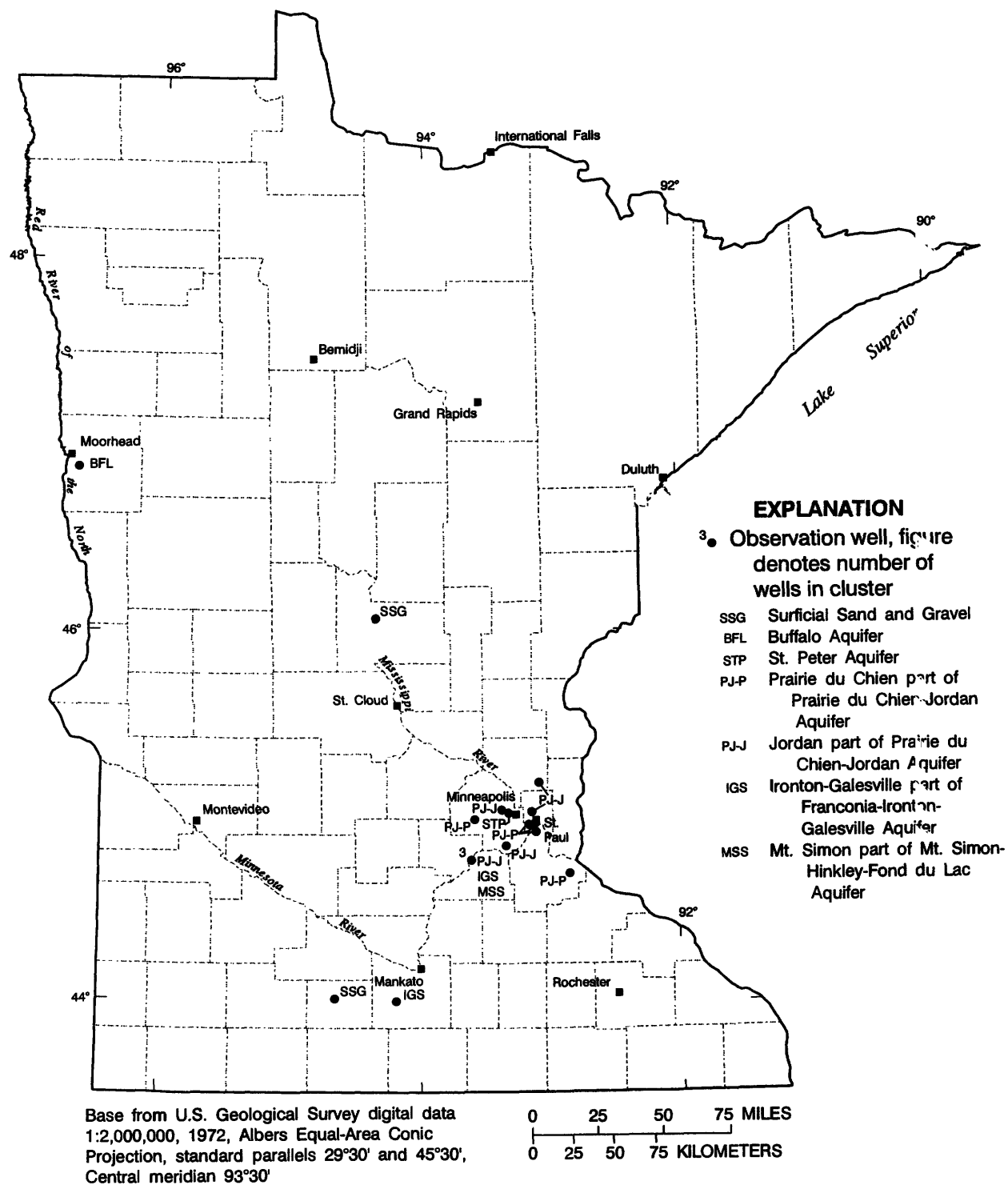


Figure 10.--Location of ground-water wells.

ANOKA COUNTY

450927093033802. Local number, 031N22W23CBC02.

LOCATION.-- Lat 45°09'27", long 93°03'38", in SW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.23, T.31 N., R.22 W., Hydrologic Unit 07010206, at the city of Centerville.
Owner: U. S. Geological Survey.

AQUIFER.-- Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.-- Drilled artesian observation well, diameter 6 in. to 95 ft, 2.5 in. to 267 ft, total depth 277 ft, screened 267 to 277 ft, screen diameter 2.4 in.

INSTRUMENTATION.--Digital recorder with one-hour punch cycle.

DATUM.-- Land-surface datum is 901.6 ft above mean sea level. Measuring point: Top of recorder platform, 2.20 ft above land-surface datum.

REMARKS.-- Water level affected by nearby flowing wells.

PERIOD OF RECORD.-- Feb. 1971 to current year.

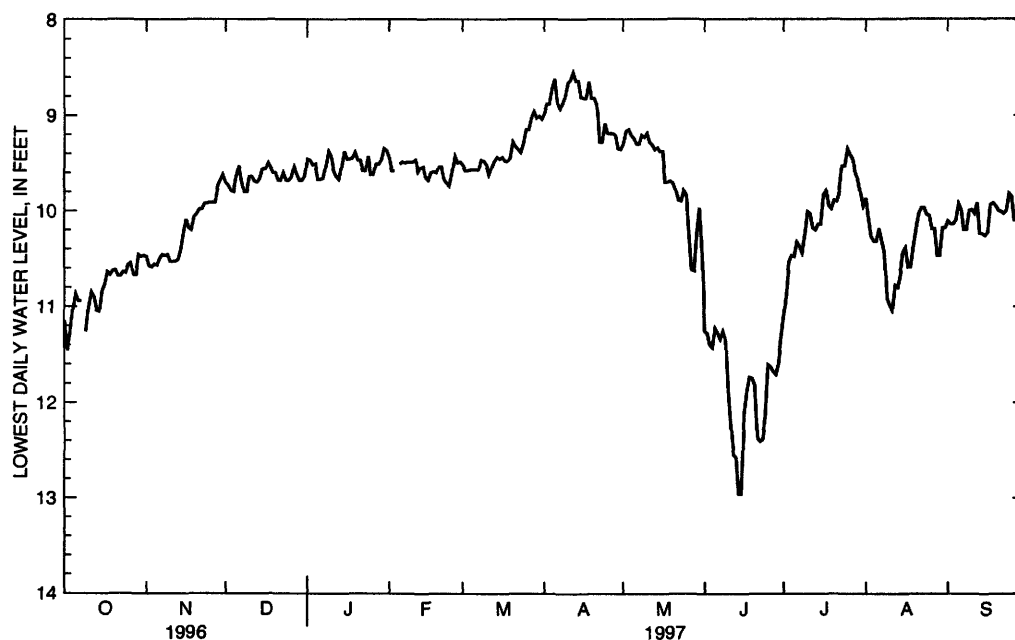
EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 7.50 ft below land-surface datum, July 8, 1993; lowest, 18.57 ft below land-surface datum, Oct. 2, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

LOWEST 5TH-DAY WATER LEVEL

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	10.87	10.57	9.64	9.67	9.51	9.57	8.62	9.24	11.23	10.48	10.32	9.93
10	10.99	10.53	9.64	9.43	9.49	9.52	8.66	9.19	11.89	10.01	10.99	9.99
15	10.84	10.23	9.56	9.38	9.65	9.46	8.81	9.38	12.96	10.14	10.44	10.26
20	10.62	10.03	9.60	9.47	9.54	9.28	8.82	9.71	11.82	9.89	10.19	10.00
25	10.57	9.91	9.68	9.62	9.60	9.15	9.19	9.84	11.61	9.35	10.05	9.85
EOM	10.47	9.62	9.64	9.37	9.49	9.04	9.36	10.42	11.34	9.95	10.18	10.20

WTR YR: LOWEST 12.96 JUN 14, 15; HIGHEST 8.32 APR 5



Well: 450927093033802. Local number, 031N22W23CBC02

BLUE EARTH COUNTY

440050094102801. Local number, 106N28W03DBA01.

LOCATION.-- Lat 44°00'50", long 94°10'28", in NE1/4NW1/4SE1/4 sec.3, T.106 N., R. 28 W., Hydrologic Unit 07020010, at Farmland Industries Ammonia Plant, 3.2 mi north of Vernon Center.

Owner: Farmland Industries.

AQUIFER.-- Ironton-Galesville Sandstones of Late Cambrian Age.

WELL CHARACTERISTICS.-- Drilled, unused artesian well, diameter 16 in., depth 390 ft, cased to 150 ft.

INSTRUMENTATION.-- Digital recorder with one-hour punch cycle.

DATUM.-- Land-surface datum is 1,005 ft above mean seal level. Measuring point: Top of recorder platform, 2.00 ft above land-surface datum.

PERIOD OF RECORD.-- Oct. 1973 to current year.

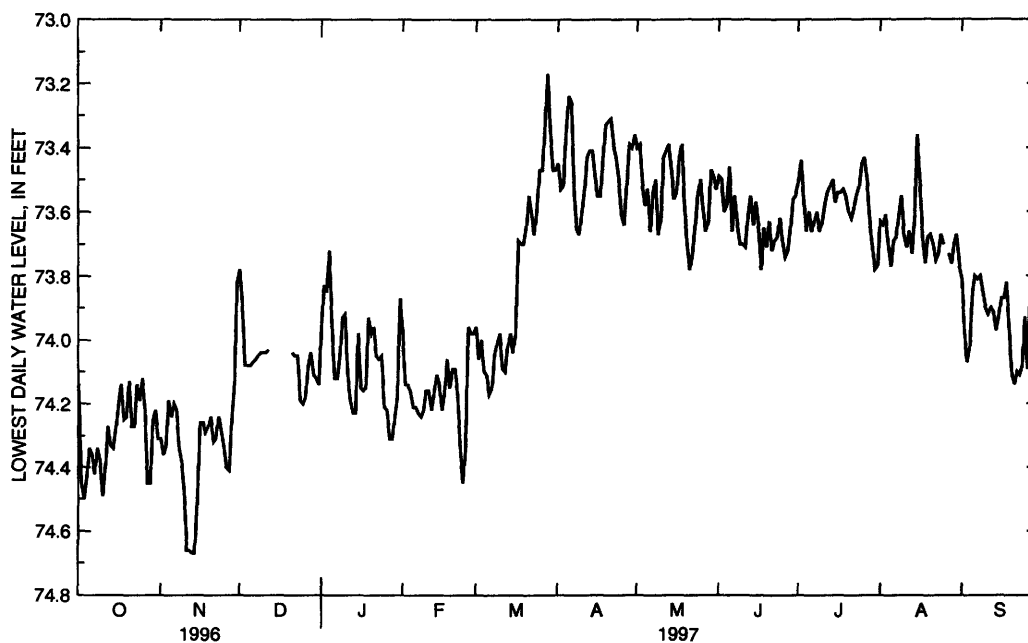
EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 71.25 ft below land-surface datum, July 4, 1993; lowest, 76.73 ft below land-surface datum, Oct. 18, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

LOWEST 5TH-DAY WATER LEVEL

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	74.34	74.24	74.08	73.96	74.21	74.11	73.24	73.53	73.46	73.60	73.77	73.85
10	74.49	74.48	74.04	73.92	74.16	73.98	73.60	73.62	73.70	73.63	73.67	73.90
15	74.28	74.48	---	73.98	74.14	74.04	73.49	73.56	73.57	73.57	73.36	73.93
20	74.13	74.24	---	73.98	74.09	73.65	73.32	73.70	73.63	73.60	73.67	74.11
25	74.12	74.33	74.20	74.21	74.34	73.47	73.61	73.50	73.69	73.45	73.70	73.93
EOM	74.31	73.82	74.14	73.87	73.98	73.47	73.36	73.53	73.55	73.77	73.77	74.20

WTR YR: LOWEST 74.67 NOV 13,14; HIGHEST 72.83 APR 5



Well: 440050094102801. Local number, 106N28W03DBA01

CLAY COUNTY

465237096383901. Local number, 139N47W05CDC01.

LOCATION.-- Lat 46°52'37", long 96°38'39", in SW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.5, T.139 N., R.47 W., Hydrologic Unit 09020104, 2.4 mi east of Dilworth.
Owner: Steven Schroeder.

AQUIFER.-- Surficial sand and gravel of Pleistocene Age (Buffalo Aquifer).

WELL CHARACTERISTICS.-- Drilled water-table observation well, diameter 8 in., depth 131.3 ft, slotted 91 to 107 ft.

INSTRUMENTATION.-- Digital recorder with 30-minute punch cycle.

DATUM.-- Land-surface datum is 916.7 ft above mean sea level. Measuring point: Top of recorder platform, 3.60 ft above land-surface datum.

REMARKS.-- Water level affected by pumping from nearby wells.

PERIOD OF RECORD.-- Jan. 1947 to current year.

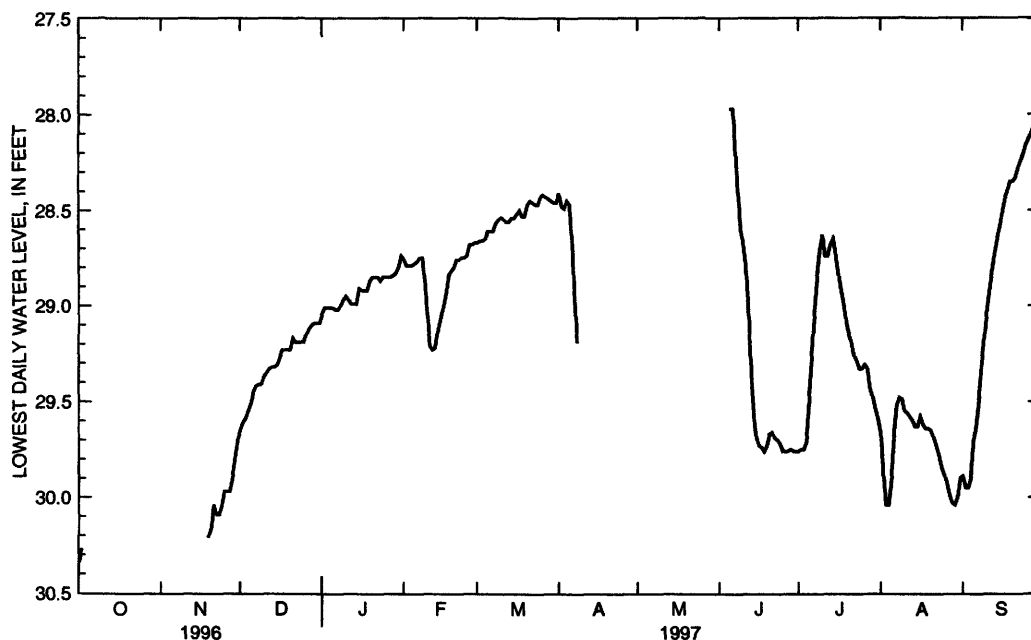
EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 12.19 ft below land-surface datum, July 15, 1947; lowest, 32.94 ft below land-surface datum, Aug. 24, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

LOWEST 5TH-DAY WATER LEVEL

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	---	---	29.51	29.01	28.78	28.61	28.47	---	27.97	29.50	29.91	29.70
10	---	---	29.37	28.95	29.06	28.54	---	---	28.69	28.63	29.55	29.04
15	---	---	29.31	28.91	29.06	28.54	---	---	29.69	28.73	29.63	28.59
20	---	30.16	29.23	28.85	28.80	28.47	---	---	29.67	29.15	29.65	28.35
25	---	29.97	29.19	28.85	28.74	28.43	---	---	29.76	29.33	29.88	28.16
EOM	---	29.70	29.09	28.74	28.67	28.46	---	---	29.76	29.59	29.90	28.02

WTR YR: LOWEST 30.34 OCT 1; HIGHEST 27.92 JUN 4



Well: 465237096383901. Local number, 139N47W05CDC01

DAKOTA COUNTY

445330093054301. Local number, 028N22W19DCC02.

LOCATION.-- Lat 44°53'30", long 93°05'43", in SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.19, T.28 N., R. 22 W., Hydrologic Unit 07010206, in West St. Paul.

Owner: U.S. Geological Survey.

AQUIFER.--Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.-- Drilled artesian observation well, diameter 6 in., depth 539 ft, cased to 409 ft.

INSTRUMENTATION.--Digital recorder with 30-minute punch cycle until Sept. 25. Electronic data logger with 30-minute scan interval.

DATUM.--Land-surface datum is 1,036.9 ft above mean sea level. Measuring point: Top of recorder platform, 2.60 ft above land-surface datum.

REMARKS.--Water-level affected by regional pumping.

PERIOD OF RECORD.--Jan. 1971 to current year.

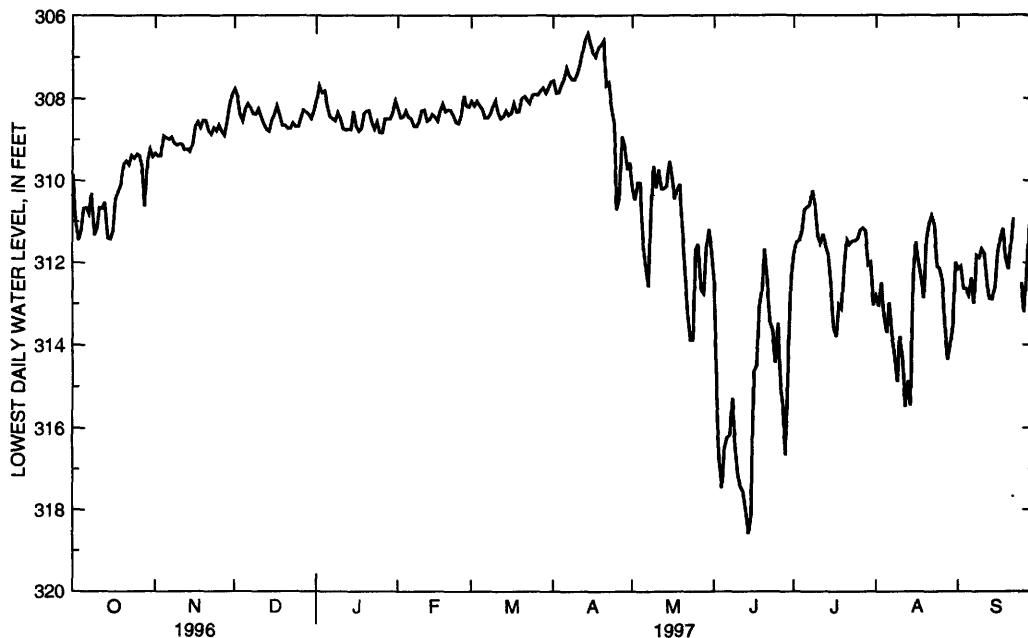
EXTREMES FOR PERIOD OF RECORD.--Highest water level, 306.22 ft below land-surface datum, Apr. 15, 1997; lowest, 328.0 ft below land-surface datum, July 31, 1975.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

LOWEST 5TH-DAY WATER LEVEL

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	310.68	308.95	308.25	308.16	308.45	308.25	307.51	311.48	316.50	310.70	313.69	312.79
10	311.16	309.09	308.25	308.48	308.29	308.05	307.39	310.16	317.18	311.36	313.80	311.67
15	311.43	309.09	308.52	308.30	308.44	308.40	306.68	309.52	318.13	312.54	312.32	312.57
20	309.60	308.54	308.64	308.29	308.28	307.99	306.59	311.17	311.67	312.12	311.41	312.16
25	309.35	308.64	308.68	308.82	308.40	307.89	310.70	311.68	313.48	311.41	312.14	312.50
EOM	309.41	307.89	308.29	308.05	308.20	307.59	309.56	311.69	312.35	313.03	311.99	312.00

WTR YR: LOWEST 318.59 JUN 14; HIGHEST 306.22 APR 15



Well: 445330093054301. Local number, 028N22W19DCC02

DAKOTA COUNTY -- Continued

444205092500001. Local number, 114N17W10AAA01.

LOCATION.-- Lat 44°42'05", long 92°50'00", in NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.10, T.114 N., R.17 W., Hydrologic Unit 07040001, southeast of Hastings.

Owner: John Conzemius.

AQUIFER.-- Prairie du Chien Group of Early Ordovician Age.

WELL CHARACTERISTICS.-- Drilled, unused artesian well, diameter 4 in., depth 151 ft, depth of casing unknown.

INSTRUMENTATION.-- Digital recorder with one-hour punch cycle until Sep. 24. Electronic data logger with one-hour scan interval.

DATUM.-- Land-surface datum is 827 ft above mean sea level. Measuring point: Top of platform, 2.50 ft above land-surface datum.

PERIOD OF RECORD.-- Apr. 1976 to current year.

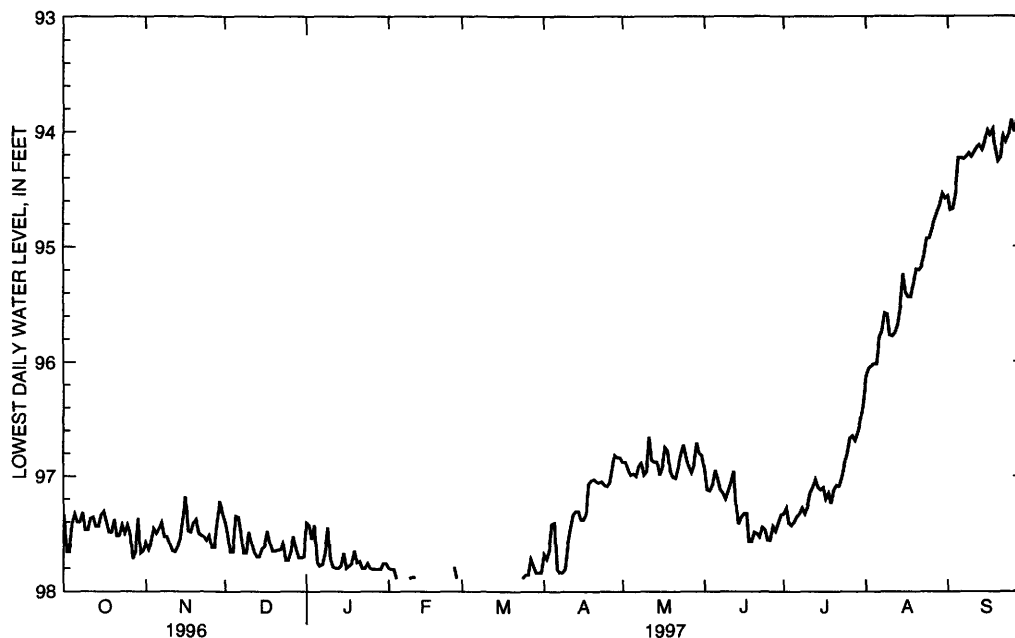
EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 93.47 ft below land-surface datum, Sep. 30, 1993; lowest, 107.4 ft below land-surface datum, Mar. 12, 1978.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

LOWEST 5TH-DAY WATER LEVEL

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	97.33	97.50	97.35	97.75	---	---	97.41	96.98	96.95	97.40	96.02	94.23
10	97.47	97.59	97.49	97.72	97.88	---	97.60	96.96	97.13	97.27	95.77	94.22
15	97.34	97.37	97.63	97.67	---	---	97.38	96.99	97.36	97.12	95.24	94.10
20	97.38	97.38	97.65	97.75	97.89	97.87	97.03	97.01	97.49	97.12	95.20	94.26
25	97.43	97.52	97.73	97.80	---	97.86	97.09	96.83	97.56	96.81	94.93	93.90
EOM	97.65	97.33	97.70	97.76	---	97.84	96.84	96.82	97.34	96.37	94.58	94.20

WTR YR: LOWEST 97.91 FEB 16; HIGHEST 93.60 SEP 22, 29



Well: 444205092500001. Local number, 114N17W10AAA01

HENNEPIN COUNTY

444801093202801. Local number, 027N24W30BDA01.

LOCATION.-- Lat 44°48'01", long 93°20'28", in NE¼SE¼NW¼ sec.30, T.27 N., R.24 W., Hydrologic Unit 07020012, by Southwood School in Bloomington.

Owner: City of Bloomington.

AQUIFER.-- Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.--Drilled, unused artesian well, diameter 12 in. to 137 ft, 8 in. to 269 ft, total depth 365 ft, cased to 269 ft.

INSTRUMENTATION.-- Digital recorder with 30-minute punch cycle until Sep. 25. Electronic data logger with 30-minute scan interval.

DATUM.-- Land-surface datum is 815 ft above mean sea level. Measuring point: Top of recorder platform, 2.20 ft above land-surface datum.

REMARKS.-- Water level affected by pumping.

PERIOD OF RECORD.-- Mar. 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 63.05 ft below land-surface datum, Apr. 15, 1969; lowest, 87.34 ft below land-surface datum, Jan. 30, 1997.

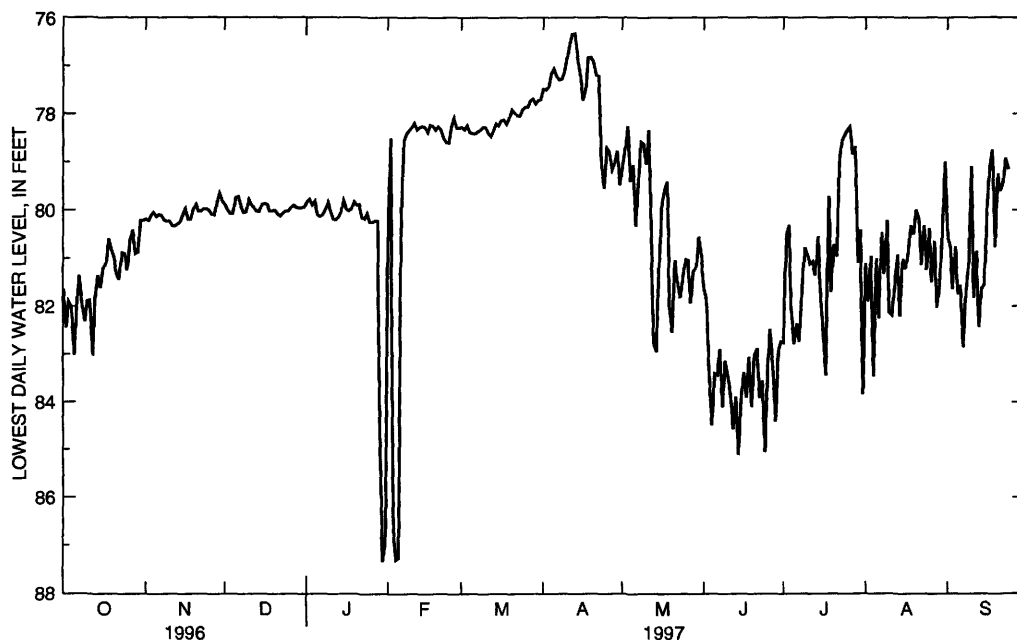
REVISIONS.-- Water levels for Aug. 7 to Sep. 30, 1995.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

LOWEST 5TH-DAY WATER LEVEL

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	83.02	80.13	79.74	80.09	87.27	78.40	77.06	79.07	83.41	82.79	81.01	81.75
10	81.89	80.23	79.78	80.02	78.28	78.28	76.83	79.04	83.47	80.95	82.13	79.09
15	81.61	80.11	79.88	79.80	78.28	78.24	77.18	81.21	83.96	81.68	81.03	81.56
20	81.00	79.88	80.00	79.90	78.26	77.92	76.90	82.54	83.01	80.72	80.00	79.25
25	81.24	80.00	80.02	80.25	78.28	77.85	78.71	81.03	83.27	78.34	80.39	---
EOM	80.21	79.81	79.94	86.99	78.29	77.70	79.48	80.96	82.75	83.84	79.00	---

WTR YR: LOWEST 87.34 JAN 30; HIGHEST 76.24 APR 12



Well: 444801093202801. Local number, 027N24W30BDA01

HENNEPIN COUNTY -- Continued

450116093205301. Local number, 029N24W06CCC01.

LOCATION.-- Lat 45°01'16", long 93°20'53", in SW1/4SW1/4SW1/4 sec.6, T.29 N., R.24 W., Hydrologic Unit 07010206, at the corner of 36th Avenue and Unity Avenue North, Robbinsdale.

Owner: Minnesota Department of Transportation.

AQUIFER.-- St. Peter Sandstone of Middle Ordovician Age.

WELL CHARACTERISTICS.-- Drilled, unused artesian well, diameter 5 in., depth 200 ft, cased to 152 ft.

INSTRUMENTATION.-- Digital recorder with 30-minute punch cycle until Sep. 24. Electronic data logger with 30-minute scan interval.

DATUM.-- Land-surface datum is 870 ft above mean sea level. Measuring point: Top of casing, 3.50 ft above land-surface datum.

REMARKS.-- Water level affected by pumping.

PERIOD OF RECORD.-- Mar. 1973 to current year.

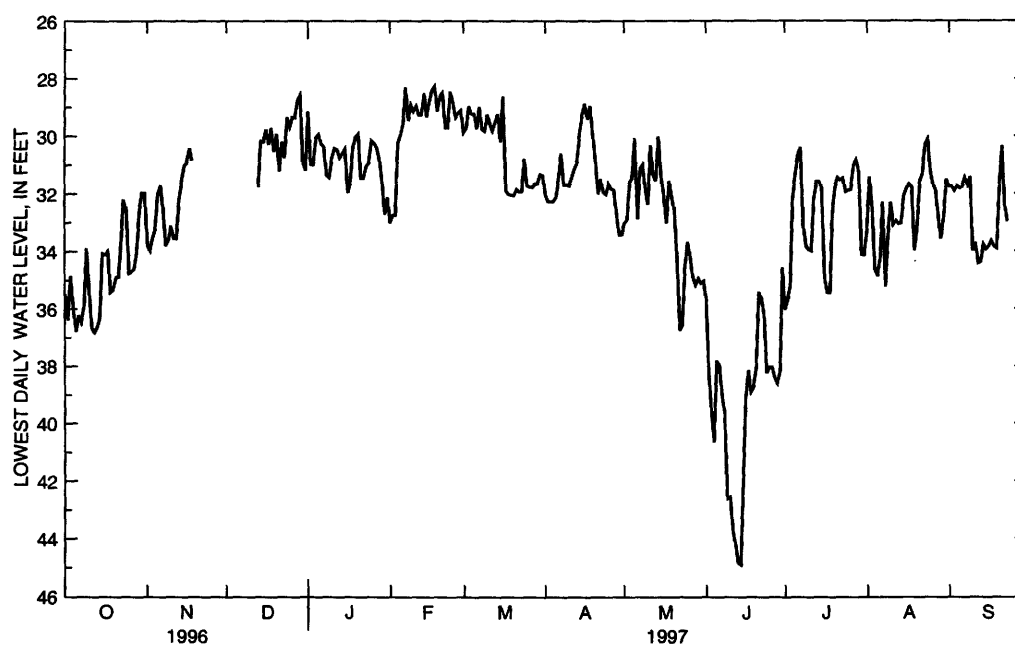
EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 24.54 ft below land-surface datum, Dec. 28, 29, 1975; lowest, 53.03 ft below land-surface datum, June 15, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

LOWEST 5TH-DAY WATER LEVEL

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	36.78	31.99	---	29.94	29.98	29.22	32.10	30.07	37.79	31.33	34.87	31.80
10	35.38	33.10	---	30.77	29.12	29.24	31.70	32.35	42.55	33.95	32.30	33.98
15	34.06	31.02	30.19	30.44	29.33	30.19	29.28	31.35	42.05	31.79	32.06	33.94
20	34.90	---	29.92	29.92	28.59	32.03	30.80	32.58	38.01	31.78	33.18	31.69
25	34.74	---	29.66	30.14	28.84	31.70	31.65	33.67	38.01	31.86	31.18	---
EOM	31.97	---	31.17	32.12	29.09	31.36	33.40	35.03	34.56	34.12	31.51	---

WTR YR: LOWEST 44.90 JUN 14; HIGHEST 26.61 FEB 17



Well: 450116093205301. Local number, 029N24W06CCC01

HENNEPIN COUNTY -- Continued

445740093333001. Local number, 117N23W11BBD01.

LOCATION.-- Lat 44°57'40", long 93°33'30", in SE¼NW¼NW¼ sec.11, T.117 N., R.23 W., Hydrologic Unit 07010206, 2 mi southwest of Wayzata, at Lake Minnetonka.

Owner: Minnetonka Boat Works, Inc., Orono.

AQUIFER.-- Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.-- Drilled artesian observation well, diameter 6 in., depth 437 ft, cased to 270 ft.

INSTRUMENTATION.-- Electronic data logger with 15-minute scan interval.

DATUM.-- Land-surface datum is 930.8 ft above mean sea level. Measuring point: Floor of recorder platform, 3.30 ft above land-surface datum.

REMARKS.-- Water level affected by pumping.

PERIOD OF RECORD.-- Aug. 1942 to current year.

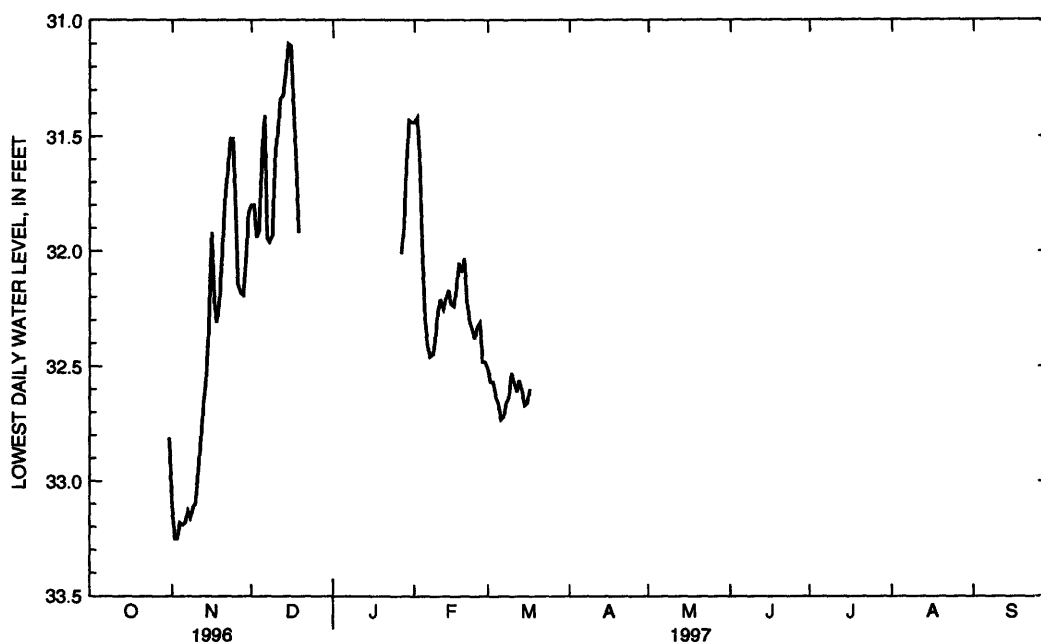
EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 14.05 ft below land-surface datum, Apr. 30, 1954; lowest, 44.77 ft below land-surface datum, June 28, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

LOWEST 5TH-DAY WATER LEVEL

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	---	33.19	31.56	---	32.28	32.66	---	---	---	---	---	---
10	---	33.10	31.57	---	32.26	32.53	---	---	---	---	---	---
15	---	32.32	31.10	---	32.23	32.67	---	---	---	---	---	---
20	---	32.00	---	---	32.03	---	---	---	---	---	---	---
25	---	31.79	---	---	32.33	---	---	---	---	---	---	---
EOM	32.81	31.83	---	31.44	32.48	---	---	---	---	---	---	---

WTR YR: LOWEST 35.94 MAY 21; HIGHEST 30.92 DEC 16



Well: 445740093333001. Local number, 117N23W11BBD01

HENNEPIN COUNTY -- Continued

450223093231801. Local number, 118N21W07DCB01.

LOCATION.-- Lat 45°02'23", long 93°23'18", in NW¼SW¼SE¼ sec.7, T.118 N., R.21 W., Hydrologic Unit 07010206, by water tower at 47th Avenue North and Aquila Avenue.

Owner: City of New Hope.

AQUIFER.-- Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.-- Drilled, unused artesian well, diameter 16 in., depth 422 ft, cased to 339 ft.

INSTRUMENTATION.-- Digital recorder with 30-minute punch cycle until Sep. 25. Electronic data logger with 30-minute scan interval.

DATUM.-- Land-surface datum is 933 ft above mean sea level. Measuring point: Top of recorder platform, 3.00 ft above land-surface datum

REMARKS.-- Water level affected by pumping.

PERIOD OF RECORD.-- Oct. 1965 to current year.

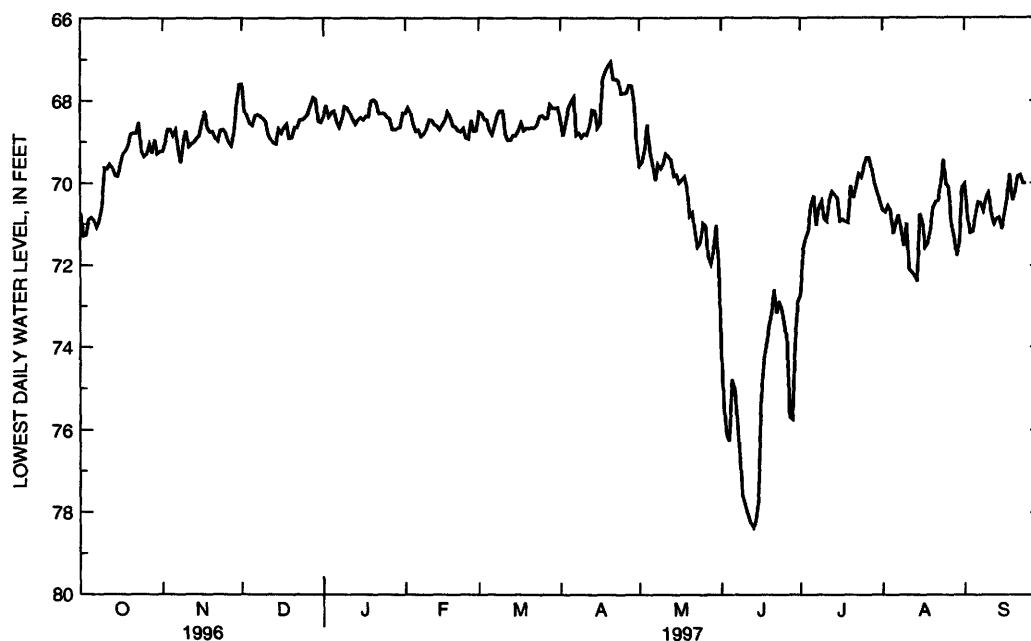
EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 60.46 ft below land-surface datum, Dec. 17, 1967; lowest, 78.37 ft below land-surface datum, June 13, 1997.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

LOWEST 5TH-DAY WATER LEVEL

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	70.84	68.84	68.59	68.24	68.73	68.70	68.02	69.23	74.79	70.52	71.23	70.81
10	69.63	68.73	68.50	68.17	68.46	68.23	68.79	69.53	77.86	70.86	70.98	70.24
15	69.82	68.84	68.68	68.40	68.57	68.84	68.65	69.79	77.70	70.38	70.75	71.12
20	68.81	68.75	68.90	67.98	68.63	68.66	67.05	70.80	73.17	70.06	70.60	70.23
25	69.35	68.77	68.39	68.38	68.91	68.35	67.82	70.98	73.49	69.58	70.01	---
EOM	69.23	67.61	68.52	68.29	68.71	68.15	69.09	72.04	72.91	70.45	70.10	---

WTR YR: LOWEST 78.37 JUN 13; HIGHEST 66.65 NOV 30



Well: 450223093231801. Local number, 118N21W07DCB01

MORRISON COUNTY

460444094212501. Local number, 130N29W08DCC01.

LOCATION.-- Lat 46°04'44", long 94°21'25", in SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.8, T.130 N., R.29 W., Hydrologic Unit 07010104, at Camp Ripley.

Owner: Minnesota Army National Guard, Camp Ripley.

AQUIFER.-- Surficial outwash sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.-- Drilled water-table observation well, diameter 2 in., depth 59 ft, screened 56 to 59 ft.

INSTRUMENTATION.-- Monthly measurements by observer.

DATUM.-- Land-surface datum is 1,149.0 ft above mean sea level. Measuring point: Top of casing, 2.10 ft above land-surface datum.

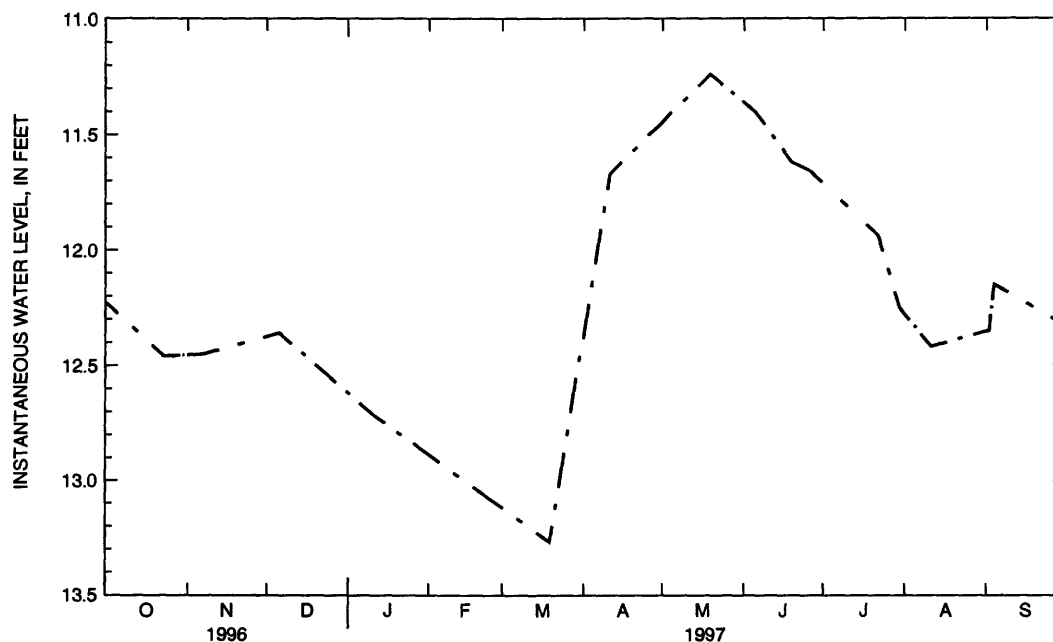
REMARKS.-- Water levels used in monthly National Water Conditions Report.

PERIOD OF RECORD.-- Apr. 1949 to current year.

EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 7.35 ft below land-surface datum, July 28, 1972; lowest, 19.75 ft below land-surface datum, Aug. 4, 1961.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 01	12.23	JAN 31	12.88	JUN 19	11.62	SEP 02	12.35
OCT 23	12.46	MAR 19	13.27	JUN 26	11.66	SEP 04	12.15
NOV 07	12.45	APR 11	11.67	JUL 22	11.94	---	---
DEC 06	12.36	MAY 19	11.24	JUL 30	12.25	1998	W.Y.
JAN 10	12.72	JUN 05	11.40	AUG 11	12.42	OCT 01	12.33



Well: 460444094212501. Local number, 130N29W08DCC01

RAMSEY COUNTY

445700093051001. Local number, 029N22W31DDD01.

LOCATION.-- Lat 44°57'00", long 93°05'10", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.31, T.29 N., R.22 W., Hydrologic Unit 07010206, at 261 E. 5th Street, St. Paul.

Owner: Control Data Corporation.

AQUIFER.-- Prairie du Chien Group of Early Ordovician Age and Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.-- Drilled, unused artesian well, diameter 16 in. to 131 ft, 12 in. to 151 ft, depth 313 ft, cased to 151 ft.

INSTRUMENTATION.-- Digital recorder with 15-minute punch cycle.

DATUM.-- Land-surface datum is 750 ft above mean sea level. Measuring point: Top of recorder platform, 9.00 ft below land-surface datum.

REMARKS.-- Water level affected by pumping of nearby wells (during summer months).

PERIOD OF RECORD.-- Dec. 1971 to current year.

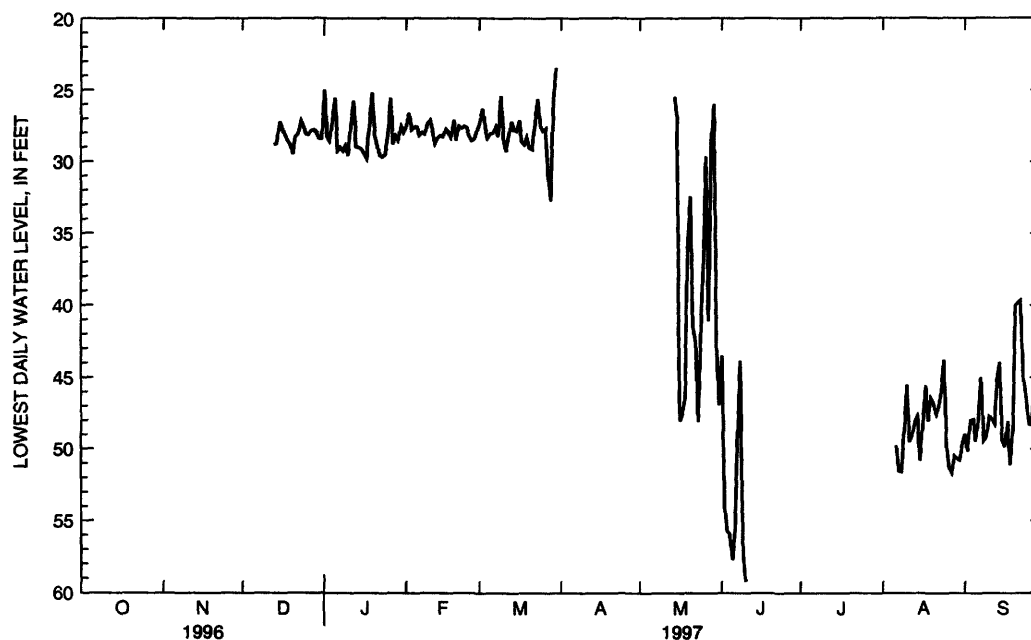
EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 14.07 ft below land-surface datum, May 30, 1997; lowest, 83.28 ft below land-surface datum, Aug. 4, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

LOWEST 5TH-DAY WATER LEVEL

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	---	---	---	25.55	27.59	28.04	---	---	57.69	---	---	49.43
10	---	---	---	29.53	27.09	28.30	---	---	59.21	---	45.53	47.70
15	---	---	27.21	29.08	28.24	27.87	---	26.74	---	---	50.79	49.32
20	---	---	29.45	28.07	28.49	29.04	---	32.42	---	---	46.76	40.04
25	---	---	28.05	28.33	28.18	27.84	---	36.70	---	---	49.58	48.26
EOM	---	---	28.39	27.93	27.79	---	---	46.89	---	---	49.64	44.18

WTR YR: LOWEST 59.49 JUN 12; HIGHEST 14.07 MAY 30



Well: 445700093051001. Local number, 029N22W31DDD01

RAMSEY COUNTY -- Continued

450238093082501. Local number, 030N23W35BDC01.

LOCATION.-- Lat 45°02'38", long 93°08'25", in SW¼SE¼NW¼ sec.35, T.30 N., R.23 W., Hydrologic Unit 07010206, southeast corner of Arbogast Street and Richmond Avenue.

Owner: City of Shoreview.

AQUIFER.-- Jordan Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.-- Drilled unused artesian well, diameter 20 in. to 129 ft, 12 in to 465 ft, total depth 510 ft, cased to 465 ft.

INSTRUMENTATION.-- Digital recorder with 30-minute punch cycle.

DATUM.-- Land-surface datum is 960 ft above mean sea level. Measuring point: Top of recorder platform, 1.50 ft above land-surface datum.

PERIOD OF RECORD.-- Apr. 1979 to current year.

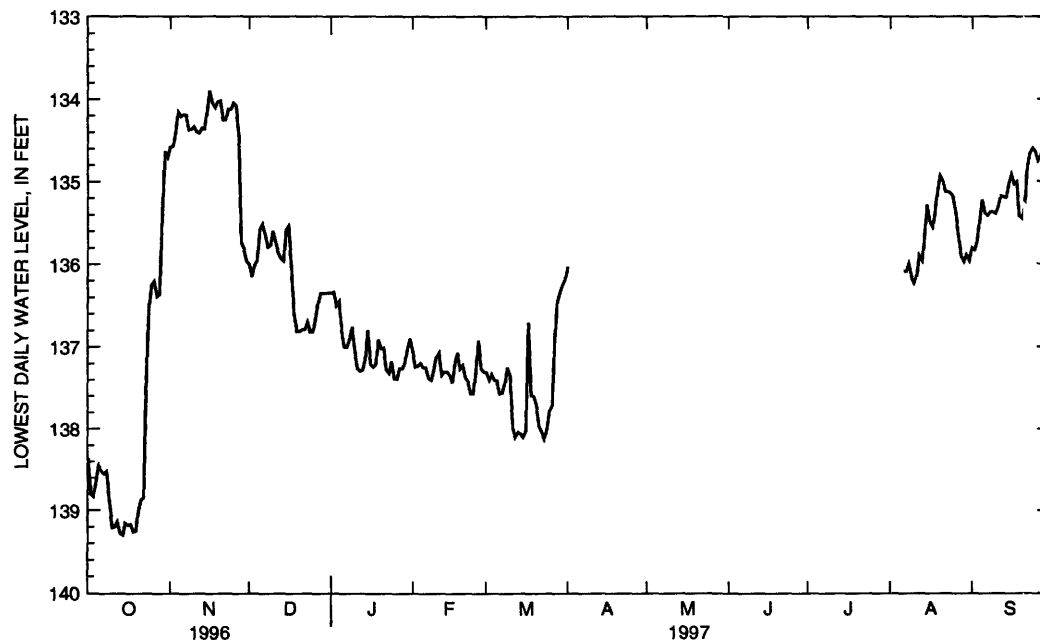
EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 129.26 ft below land-surface datum, Mar. 1, 1987; lowest, 146.01 ft below land-surface datum, July 28, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

LOWEST 5TH-DAY WATER LEVEL

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	138.45	134.21	135.59	136.80	137.25	137.41	---	---	---	---	---	135.23
10	139.21	134.33	135.60	137.04	137.12	137.35	---	---	---	---	136.23	135.39
15	139.16	134.14	135.59	136.80	137.34	138.10	---	---	---	---	135.29	135.04
20	139.00	134.02	136.81	137.02	137.22	137.71	---	---	---	---	134.93	135.45
25	136.25	134.05	136.82	137.39	137.30	137.78	---	---	---	---	135.20	134.64
EOM	134.70	135.96	136.35	136.90	137.30	136.19	---	---	---	---	135.96	134.65

WTR YR: LOWEST 139.30 OCT 14; HIGHEST 133.60 NOV 16, 17



Well: 450236093082501. Local number, 030N23W35BDC01

SCOTT COUNTY

444427093353901. Local number, 115N23W28BDD01.

LOCATION.-- Lat 44°44'27", long 93°35'39", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.28, T.115 N., R.23 W., Hydrologic Unit 07020012, Merriam Junction.

Owner: Chicago and Northwestern Transportation Company.

AQUIFER.-- Jordan Sandstone of Early Cambrian Age.

WELL CHARACTERISTICS.-- Drilled artesian observation well, diameter 16 in., depth 140 ft, cased to 75 ft.

INSTRUMENTATION.-- Electronic data logger with one-hour scan interval..

DATUM.-- Land-surface datum is 758 ft above mean sea level. Measuring point: Top of casing, 0.90 ft above land-surface datum.

PERIOD OF RECORD.-- Periodic record since Nov. 1984; continuous record, July to Sep. 1997.

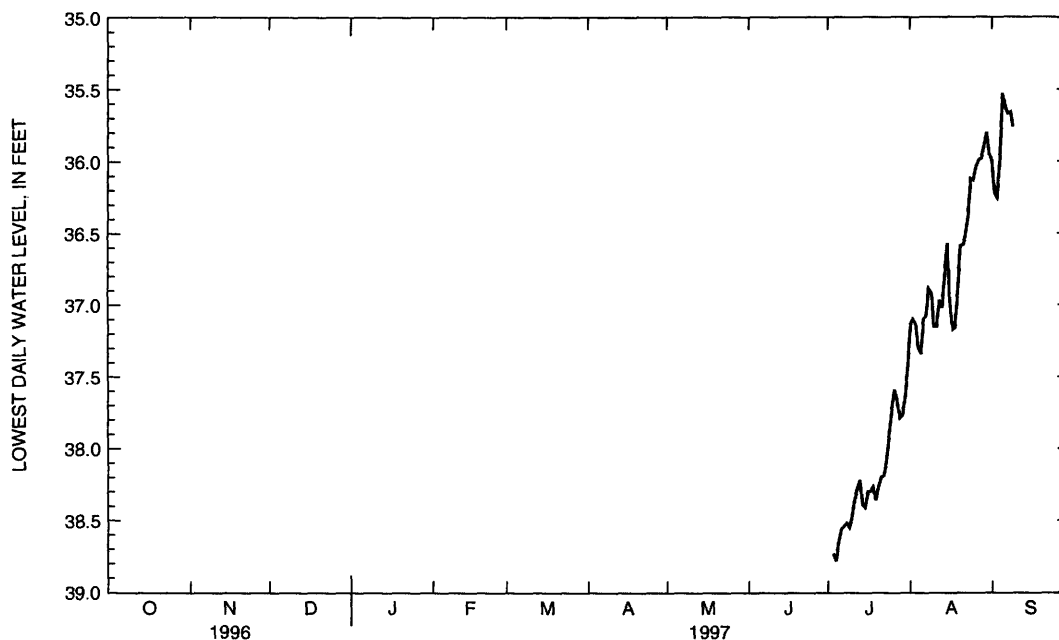
EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 25.75 ft below land-surface datum, Mar. 8, 1985; lowest, 43.20 ft below land-surface datum, Feb. 28, 1990.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

LOWEST 5TH-DAY WATER LEVEL

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	---	---	---	---	---	---	---	---	---	38.65	37.34	35.53
10	---	---	---	---	---	---	---	---	---	38.49	37.15	---
15	---	---	---	---	---	---	---	---	---	38.41	36.57	---
20	---	---	---	---	---	---	---	---	---	38.27	36.59	---
25	---	---	---	---	---	---	---	---	---	37.73	36.13	---
EOM	---	---	---	---	---	---	---	---	---	37.45	35.95	35.98

WTR YR: LOWEST 38.78 JUL 4; HIGHEST 35.08 SEP 27



Well: 444427093353901. Local number, 115N23W28BDD01

SCOTT COUNTY

444427093353902. Local number, 115N23W28BDD02.

LOCATION.-- Lat 44°44'27", long 93°35'39", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.28, T.115 N., R.23 W., Hydrologic Unit 07020012, Merriam Junction.

Owner: Chicago and Northwestern Transportation Company.

AQUIFER.-- Ironton-Galesville Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.-- Drilled artesian observation well, diameter 4 in., depth 355 ft, screened 350 to 355 ft.

INSTRUMENTATION.-- Digital recorder with one-hour punch cycle until June 30. Electronic data logger with 30-minute scan interval.

DATUM.-- Land-surface datum is 758 ft above mean sea level. Measuring point: Top of casing, 1.00 ft above land-surface datum.

PERIOD OF RECORD.-- Nov. 1984 to current year.

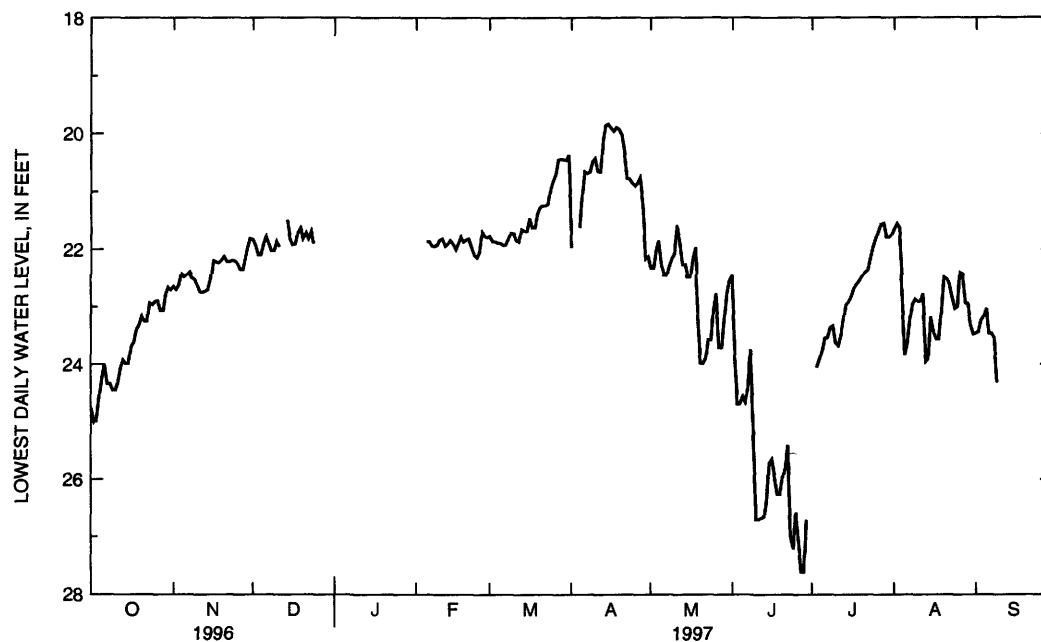
EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 19.59 ft below land-surface datum, Apr. 8, 1993; lowest, 45.28 ft below land-surface datum, July 29, 1991.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

LOWEST 5TH-DAY WATER LEVEL

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	24.24	22.48	21.91	---	21.86	21.89	21.07	22.28	24.56	23.76	23.84	22.04
10	24.46	22.62	21.87	---	21.83	21.73	20.43	22.08	26.70	23.64	22.91	---
15	23.99	22.52	21.81	---	21.90	21.68	19.83	22.48	25.72	22.92	23.18	---
20	23.17	22.13	21.81	---	21.83	21.27	20.01	23.98	25.98	22.47	22.49	---
25	22.92	22.25	---	---	22.06	20.82	20.90	23.05	26.58	21.83	23.00	---
EOM	22.71	21.81	---	---	21.79	20.36	22.13	22.56	---	21.75	23.48	22.77

WTR YR: LOWEST 27.62 JUN 27, 28; HIGHEST 19.69 APR 15



Well: 444427093353902. Local number, 115N23W28BDD02

SCOTT COUNTY -- Continued

444427093353903. Local number, 115N23W28BDD03.

LOCATION.-- Lat 44°44'27", long 93°35'39", in SE¼SE¼NW¼ sec.28, T.115 N., R.23 W., Hydrologic Unit 07020012, at Merriam Junction.

Owner: Chicago and Northwestern Transportation Company.

AQUIFER.-- Mount Simon Sandstone of Late Cambrian Age.

WELL CHARACTERISTICS.-- Drilled artesian observation well, diameter 4 in., depth 525 ft, screened 520 to 525 ft.

INSTRUMENTATION.-- Digital recorder with one-hour punch cycle until June 30. Electronic data logger with 30-minute scan interval.

DATUM.-- Land-surface datum is 758 ft above mean sea level. Measuring point: Top of casing, 1.00 ft above land-surface datum.

PERIOD OF RECORD.-- Nov. 1984 to current year.

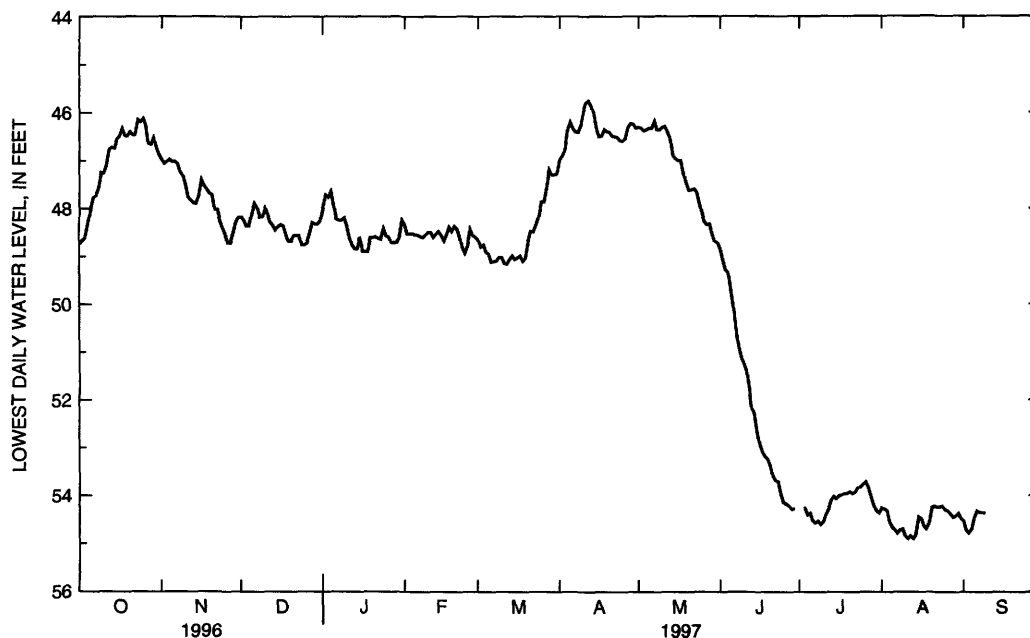
EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 33.85 ft below land-surface datum, Mar. 8, 1985; lowest, 55.12 ft below land-surface datum, Aug. 1, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

LOWEST 5TH-DAY WATER LEVEL

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	48.01	47.02	48.10	47.95	48.55	48.95	46.20	46.32	49.73	54.37	54.66	54.46
10	47.26	47.50	48.00	48.34	48.50	49.02	45.98	46.31	51.25	54.54	54.84	---
15	46.55	47.74	48.38	48.60	48.55	49.06	46.32	46.96	52.65	54.07	54.45	---
20	46.40	47.71	48.68	48.61	48.37	48.71	46.41	47.62	53.37	53.92	54.26	---
25	46.12	48.52	48.76	48.57	48.78	47.86	46.59	48.11	54.15	53.77	54.30	---
EOM	46.87	48.18	48.26	48.25	48.59	47.28	46.32	48.72	---	54.36	54.48	54.10

WTR YR: LOWEST 54.90 AUG 11, 13; HIGHEST 45.65 APR 12



Well: 444427093353903. Local number, 115N23W28BDD03

WATONWAN COUNTY

440037094372601. Local number, 106N32W01DDB01.

LOCATION.-- Lat 44°00'37", long 94°37'26", in NW¼SE¼SE¼ sec.1, T.106 N., R.32 W., Hydrologic Unit 07020010, north of St. James.

Owner: U.S. Geological Survey.

AQUIFER.-- Surficial outwash sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.-- Drilled water-table observation well, diameter 2 in., depth 22 ft, screened 19 to 22 ft.

INSTRUMENTATION.-- Monthly measurements by observer.

DATUM.-- Land-surface datum is 1,056.2 ft above mean sea level. Measuring point: Top of casing, 4.80 ft above land-surface datum.

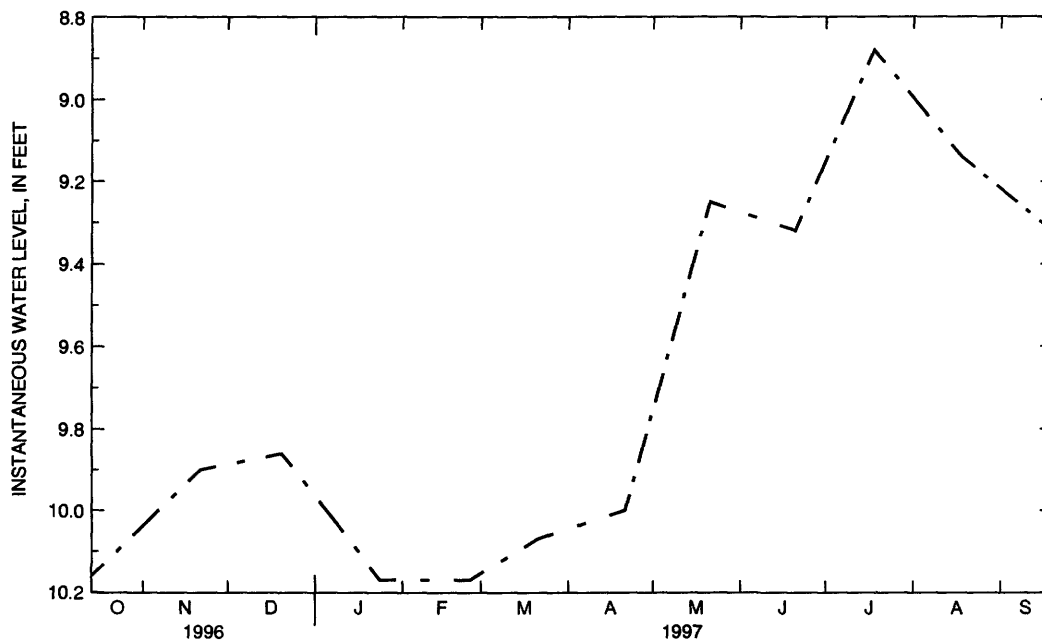
REMARKS.-- Water levels used in monthly National Water Conditions Report.

PERIOD OF RECORD.-- Nov. 1965 to current year.

EXTREMES FOR PERIOD OF RECORD.-- Highest water level, 4.11 ft below land-surface datum, Apr. 27, 1969; lowest, 16.22 ft below land-surface datum, Mar. 7, 1990.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 14	10.16	JAN 24	10.17	APR. 21	10.00	JUL 18	8.88
NOV 21	9.90	FEB 25	10.17	MAY 21	9.25	AUG 18	9.14
DEC 20	9.86	MAR 21	10.07	JUN 20	9.32	SEP 19	9.32



Well: 440037094372601. Local number, 106N32W01DDB01

Quality Of Ground Water

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

HENNEPIN COUNTY

STATION NUMBER DATE TIME			SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD (UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD (UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	
450406093170204	07-09-97	0900	2020	1910	7.1	7.2	11.5	10	
450406093170205	07-09-97	1000	912	874	7.4	7.3	12.5	1.6	
450414093184304	07-24-97	1000	1290	1250	7.3	7.3	11.0	1.1	
450414093184305	07-08-97	1400	1370	1290	7.2	7.2	9.5	9.0	
450415093184801	07-07-97	1100	910	907	7.3	7.2	16.0	10	
450415093184802	07-08-97	0900	1010	957	7.2	7.3	10.0	48	
450415093184803	07-08-97	1100	981	959	7.2	7.2	9.5	91	
450423093194301	07-10-97	1300	874	810	6.5	6.5	12.5	19	
450423093194303	07-09-97	1500	1410	1410	6.8	6.9	11.5	4.2	
450423093194304	07-09-97	1300	1740	1690	6.9	7.0	12.0	27	
450423093194305	07-10-97	0900	3030	2880	7.0	7.0	14.0	23	
450424093210502	07-15-97	0900	1150	1120	7.0	7.2	20.5	13	
450424093210504	07-14-97	1200	964	933	7.1	7.2	12.5	20	
450424093210505	07-14-97	0900	1240	1190	7.0	7.2	17.0	10	
450425093195303	07-10-97	1400	1180	1000	7.2	7.1	11.5	2.2	
450430093220801	07-15-97	1400	767	--	7.1	--	10.5	10	
DATE	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GF'N,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)
07-09-97	749	0.9	710	296	308	361	0.039	<0.010	<0.20
07-09-97	748	0.5	440	234	221	286	0.040	<0.010	<0.20
07-24-97	745	0.7	310	400	421	488	3.76	<0.010	4.3
07-08-97	745	0.7	350	371	383	453	1.57	<0.010	2.2
07-07-97	747	1.8	360	271	284	331	0.103	0.218	0.40
07-08-97	743	1.3	420	262	276	320	0.055	0.036	0.38
07-08-97	747	0.7	420	266	250	303	0.084	0.044	0.34
07-10-97	748	<0.1	310	317	252	387	1.63	<0.010	11
07-09-97	745	0.3	420	312	321	381	3.75	<0.010	5.2
07-09-97	747	0.4	400	332	340	395	3.18	<0.010	4.4
07-10-97	747	0.2	700	352	346	429	0.895	<0.010	1.3
07-15-97	741	0.5	470	316	326	385	0.194	<0.010	0.47
07-14-97	740	0.4	410	281	295	343	0.099	<0.010	0.39
07-14-97	735	1.4	480	354	316	432	0.220	<0.010	0.39
07-10-97	747	0.9	240	299	302	365	0.513	<0.010	1.1
07-15-97	743	8.1	--	--	--	--	0.021	<0.010	<0.20

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

HENNEPIN COUNTY

STATION NUMBER	DATE	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
450406093170204	07-09-97	0.058	<0.010	<0.010	1.5	180	64	103
450406093170205	07-09-97	0.052	<0.010	<0.010	1.5	110	41	11
450414093184304	07-24-97	<0.050	1.44	1.34	8.3	82	25	120
450414093184305	07-08-97	<0.050	0.934	0.926	7.6	94	28	140
450415093184801	07-07-97	3.07	<0.010	0.011	7.2	100	24	40
450415093184802	07-08-97	2.55	<0.010	0.011	3.2	120	29	28
450415093184803	07-08-97	2.73	<0.010	0.010	4.3	120	28	28
450423093194301	07-10-97	<0.050	0.399	0.383	20	95	18	25
450423093194303	07-09-97	0.082	<0.010	<0.010	7.1	130	26	119
450423093194304	07-09-97	<0.050	<0.010	0.016	5.8	120	24	190
450423093194305	07-10-97	<0.050	<0.010	0.017	4.7	200	50	333
450424093210502	07-15-97	0.335	<0.010	0.013	6.9	130	35	36
450424093210504	07-14-97	<0.050	<0.010	0.013	5.8	120	28	24
450424093210505	07-14-97	<0.050	<0.010	<0.010	5.0	140	32	49
450425093195303	07-10-97	<0.050	0.082	0.086	7.4	69	16	142
450430093220801	07-15-97	2.29	0.044	0.062	--	--	--	--
DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
07-09-97	5.0	380	120	<0.10	17	15	988	1210
07-09-97	2.6	70	130	0.17	20	58	544	582
07-24-97	2.8	150	6.2	0.19	27	2100	1210	739
07-08-97	3.0	180	28	0.12	25	2100	891	776
07-07-97	3.3	91	54	0.21	16	8.7	627	571
07-08-97	3.5	110	64	0.10	19	<3.0	699	607
07-08-97	3.6	110	63	0.11	19	<3.0	614	613
07-10-97	3.1	74	3.1	0.15	21	7900	600	517
07-09-97	5.2	200	110	0.13	20	860	1010	875
07-09-97	5.6	250	160	0.16	19	1200	1150	1030
07-10-97	6.9	590	300	0.13	22	5500	2240	1860
07-15-97	4.2	130	73	0.23	22	2500	2120	693
07-14-97	3.5	100	43	0.27	20	1400	1360	571
07-14-97	4.3	130	84	0.14	23	6500	1230	764
07-10-97	4.2	100	140	0.16	22	5000	890	729
07-15-97	--	--	--	--	--	--	--	--

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

MILLE LACS COUNTY

STATION NUMBER	DATE	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
454816093320401	05-29-97	947	7.0	8.0	735	2.9	<0.015
454818093320401	05-29-97	1290	7.0	8.5	735	2.2	<0.015
454819093320001	05-29-97	375	7.4	11.0	735	5.8	<0.015
454819093320501	05-29-97	1670	7.1	8.0	735	4.1	0.016
454820093320401	05-29-97	952	7.1	8.0	735	2.8	<0.015

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
05-29-97	<0.010	0.25	1.18	<0.010	0.012	110	74
05-29-97	<0.010	0.37	0.112	<0.010	<0.010	220	97
05-29-97	<0.010	<0.20	0.080	<0.010	<0.010	3.4	8.4
05-29-97	0.012	1.1	14.5	<0.010	0.016	340	97
05-29-97	<0.010	0.33	0.887	<0.010	<0.010	150	64

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

REDWOOD COUNTY

STATION NUMBER	DATE	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
441428095073601	05-28-97	2520	6.5	7.0	740	1	0.037
441428095073701	05-28-97	1510	7.7	8.5	740	4.3	<0.015
441430095073705	05-28-97	2430	6.7	9.0	740	0.7	0.631
441431095073705	05-28-97	2740	6.5	9.0	740	0.9	0.337
441432095073601	05-28-97	2140	6.6	7.0	740	1.8	0.347
441432095073705	05-28-97	--	--	--	--	--	0.132

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
05-28-97	<0.010	0.64	0.053	<0.010	<0.010	350	450
05-28-97	<0.010	0.81	0.390	<0.010	<0.010	240	130
05-28-97	<0.010	1.3	<0.050	<0.010	<0.010	290	450
05-28-97	<0.010	0.77	<0.050	<0.010	<0.010	340	560
05-28-97	<0.010	1.2	<0.050	0.036	0.050	240	350
05-28-97	<0.010	0.99	0.115	<0.010	<0.010	180	1300

QUALITY OF GROUND WATER
WATER QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

ROCK COUNTY

STATION NUMBER	DATE	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	SULFATE DIS-SOLVED (MG/L AS SC4) (00945)
433318096105901	08-27-97	759	7.0	9.5	1.5	0.013	8.79	--	--
433345096110001	04-09-97	673	7.2	7.5	0.5	<0.010	0.330	--	--
	06-02-97	726	6.8	7.5	6.9	<0.010	0.425	--	--
433345096110002	11-13-96	716	7.2	12.0	0.3	0.030	0.240	20	83
	04-09-97	742	7.3	7.0	0.6	<0.010	0.410	--	--
	06-02-97	719	7.0	7.5	7.6	<0.010	0.392	--	--
	07-23-97	705	7.2	9.0	0.3	<0.010	0.523	--	--
	08-27-97	720	7.1	11.0	0.1	<0.010	0.344	--	--
433347096113501	11-14-96	883	7.2	10.5	4.8	0.030	16.0	29	94
	04-08-97	706	7.4	5.0	7.2	<0.010	15.0	--	--
	06-02-97	817	7.0	7.0	5.4	<0.010	15.5	--	--
	08-27-97	874	7.0	11.0	5.0	<0.010	16.6	--	--
433413096111701	08-28-97	700	7.1	12.5	0.4	<0.010	2.00	--	--
433424096120901	06-02-97	882	7.0	9.5	6.4	<0.010	18.2	--	--
	08-27-97	771	7.0	13.0	5.5	<0.010	13.6	--	--
433750096123201	06-02-97	930	6.9	12.0	1.7	<0.010	4.66	--	--
433812096115601	08-28-97	905	7.0	11.5	0.1	<0.010	0.109	--	--
433911096113601	04-08-97	962	7.4	6.5	0.6	<0.010	<0.050	--	--
433920096114901	11-13-96	793	7.2	11.0	0.2	0.040	0.660	36	77
	04-08-97	782	7.3	5.0	0.4	<0.010	0.960	--	--
	06-03-97	836	6.9	7.0	0.1	<0.010	1.04	--	--
	07-23-97	827	7.1	10.5	0.1	0.025	1.29	--	--
	08-27-97	800	7.1	14.5	0.1	0.036	0.530	--	--
433922096114001	08-27-97	750	7.0	9.5	0.6	<0.010	0.238	--	--
433928096120801	08-28-97	716	7.2	13.0	6.2	<0.010	8.33	--	--
433929096113601	04-08-97	735	7.3	8.0	0.7	<0.010	2.20	--	--
	08-27-97	736	7.0	9.5	0.5	<0.010	2.16	--	--
433929096114701	11-14-96	1030	6.9	11.0	0.2	<0.010	<0.050	72	60
	06-02-97	719	6.9	7.0	0.1	0.038	0.264	--	--
	08-28-97	925	6.9	12.0	0.1	<0.010	<0.050	--	--
433929096114702	11-14-96	803	7.1	9.0	0.2	<0.010	<0.050	31	82
	06-02-97	813	6.9	9.0	0.1	<0.010	0.053	--	--
	08-28-97	794	7.0	10.0	0.1	<0.010	0.055	--	--
433932096113701	04-08-97	711	7.3	8.0	0.3	<0.010	0.790	--	--
	08-27-97	742	7.1	11.0	0.1	<0.010	0.993	--	--
433952096113101	06-03-97	644	7.0	10.0	0.2	<0.010	3.28	--	--
	08-28-97	642	7.2	14.0	0.1	<0.010	3.25	--	--

A

Access to USGS Water Data	16
Accuracy of the Records	12
Ada, Marsh River Ditch near	374
Aitkin, Mississippi River at	156
Aldrich, Leaf River near	376
Anoka, Mississippi River near	220
Appleton, Pomme de Terre River at	252
Argyle, Middle River at	104
Arrangement of Records, water quality	13
Ashley Creek near Sauk Centre	376
Aurora, St. Louis River at	372
Austin, Cedar River near	364

B

Babitt, Stony River near	374
Bancroft Creek at Bancroft	381
Bancroft, Bancroft Creek at	381
Barnesville, Whiskey Creek at	374
Basswood River near Winton	124
Baudette, North Branch Rapid River near	375
Baudette, Winter Road River near	375
Beauford, Little Cobb River near	274
Beaver Creek at Beaver Falls	378
Beaver Creek at Valley Springs, S.D.	381
Beaver Falls, Beaver Creek at	378
Beaver, Whitewater River near	356
Becida, Hennepin Creek near	375
Bemidji, Mississippi River at	375
Bemidji, Mississippi River near	144
Big Fork River near Bigfork	374
Big Lake, Elk River near	188
Big Stone City, SD, Whetstone River near	244
Bigfork, Big Fork River near	374
Blue Earth River near Rapidan	272
Bois de Sioux River near Doran	44
Bois de Sioux River near White Rock, SD	42
Bowerman Brook near Craigville	375
Boy River near Remer	375
Brainerd, Gull Lake near	168
Brainerd, Mississippi River at	160
Brewster, Elk River near	381
Buffalo Creek near New Auburn	377
Buffalo River near Callaway	373
Buffalo River near Dilworth	64
Buffalo River near Hawley	60
Bug Creek at Shaw	373
Burnham Creek near Crookston	374
Burr, Florida Creek near	377

C

Callaway, Buffalo River near	373
Cannon River at Northfield	379
Cannon River at Welch	342
Cannon River below Sabre Lake near Kilkenny	379
Caribou, Roseau River below State Ditch 51, near	118
Cascade River near Grand Marais	372
Cat River near Nimrod	376
Cedar River near Austin	364
Ceylon, East Fork Des Moines River at	381
Champepagan Creek at Co. Rd. 18 near Leota	381
Champlin, Elm Creek near	214
Chanarambi Creek near Edgerton	381
Chippewa River near Milan	256
Chisholm, Sturgeon River at	132

page

page

Classification of Records	12
Clearwater River at Plummer	88
Clearwater River at Red Lake Falls	92
Clearwater River near South Haven	377
Climax, Sand Hill River at	76
Cloquet River near Toimi	373
Concord, Milliken Creek near	380
Cooperation	1
Cottonwood River near New Ulm	266
Cottonwood River near Springfield	378
Courtland, Little Cottonwood River near	268
Craigville, Bowerman Brook near	375
Crane Lake, Vermilion River near	128
Crooked Creek at Freeburg	380
Crooked Creek near Hinckley	379
Crookston, Burnham Creek near	374
Crookston, Red Lake River at	94
Cross Lake, Pine River Reservoir at	158
Crow River at Rockford	204
Crow Wing River at Nimrod	164
Crow Wing River near Pillager	170

D

Data Collection and Computation	9
Data Collection and Computation, ground-water levels	15
Data Collection and Computation, records of ground-water quality	16
Data Presentation	10
Data Presentation, ground-water levels	15
Data Presentation, records of ground-water quality	16
Data Presentation, water quality	13
Deer Creek near Holyoke	34
Deer River, Winnibigoshish Lake near	146
Definition of Terms	16
Delft, Watonwan River near	378
Des Moines River at Jackson	366
Dilworth, Buffalo River near	64
Doran, Bois de Sioux River near	44
Downer, Spring Creek above	374
Downstream Order System and Station Number	9
Drayton, ND, Red River of the North at	106
Duluth, Talmadge River at	372
Dumont, Twelvemile Creek near	373
Dunnell, Fourmile Creek near	381

E

East Branch Blue Earth River near Walters	378
East Fork Des Moines River near Ceylon	381
Edgerton, Chanarambi Creek near	381
Elbow Lake, Pomme de Terre River near	377
Elizabeth, Otter Tail River near	36
Elk Creek near Lismore	381
Elk River near Big Lake	188
Elk River near Brewster	381
Elm Creek near Champlin	214
Elm Creek near Trimont	378
Ely, Kawishiwi River near	120
Emerson, Manitoba, Red River of the North at	112
Empire, Vermillion River near	334
Explanation of the Records, definition of	9

F

Fairbanks, North Branch Whiteface River near	373
Fargo, ND, Red River of the North at	56
Faribault, Straight River near	338
Federal Dam, Leech Lake at	148
Fergus Falls, Orwell Lake near	38

	page
Fergus Falls, Otter Tail River below Orwell Dam, near	40
Florida Creek near Burr	377
Fort Frances, Ontario, Rainy Lake near	130
Fort Ripley, Mississippi River near	172
Fort Ripley, Nokassippi River	376
Fourmile Creek near Dunnell	381
Foxhome, Ottetail River near	373
Freeburg, Crooked Creek at	380

G

Garden City, Watonwan River near	270
Gaylord, Middle Branch Rush River near	379
Glaisby Brook near Kettle River	379
Gonvick, Ruffy Brook near	374
Goodridge, Red Lake River at High Landing near	84
Goose Creek at Harris	379
Grand Forks, ND, Red River of the North at	96
Grand Marais, Cascade River near	372
Grand Portage, Pigeon River at Middle Falls, near	28
Grand Rapids, Mississippi River at	152
Grand Rapids, Pokegama Lake near	150
Granite Falls, Yellow Medicine River near	260
Ground-water level records, by county	436
Ground-water quality data, by county	452
Grygla, Mud River near	374
Gull Lake near Brainerd	168

H

Halstad, Red River of the North at	70
Harris, Goose Creek at	379
Hastings, Mississippi River below Lock and Dam 2, near	312
Hawk Creek near Maynard	378
Hawley, Buffalo River near	60
Henderson, High Island Creek near	296
Hendrum, Wild Rice River at	68
Hennepin Creek near Becida	375
Hickson, ND, Red River of the North at	52
High Island Creek near Henderson	296
High-flow partial-record stations	372
Hill City, Smith Creek near	375
Hillman Creek near Pierz	376
Hinckley, Crooked Creek near	379
Holyoke, Deer Creek near	34
Holyoke, Nemadji River near	373
Houston, Root River near	362
Houston, South Fork Root River near	380
Hydrologic Bench-Mark Network, definition of	7

I

Identifying Estimated Daily Discharge	12
Introduction	1

J

Jackson, Des Moines River at	366
Johnsburg, Little Cedar River near	380
Johnson Creek near St. Augusta	377
Jordan, Minnesota River near	298

K

Kawishiwi River near Ely	120
Kawishiwi River near Winton	122
Kettle River below Sandstone	320
Kettle River, Glaisby Brook near	379
Kilkenny, Cannon River below Sabre Lake near	379
Kingston, North Fork Crow River near	377
Knife River near Mora	324
Knife River near Two Harbors	30

L

Laboratory Measurements, surface-water quality	13
Lac la Croix, Ontario, Namakan River at outlet of	126
Lac qui Parle River near Lac qui Parle	254
Lac qui Parle, Lac qui Parle River near	254
Lake Bronson, South Branch Two Rivers at	110
Lake of the Woods at Springsteel Island near Warroad	142
Lanesboro, Root River near	380
Le Sueur River near Rapidan	286
Leaf River near Aldrich	376
Leech Lake at Federal Dam	148
Leota, Champepadan Creek at Co. Rd. 18 near	381
Libby, Sandy Lake at	154
Lismore, Elk Creek near	381
Little Cedar River near Johnsburg	380
Little Chippewa River near Starbuck	377
Little Cobb River near Beauford	274
Little Cottonwood River near Courtland	268
Little Fork River at Littlefork	138
Little Minnesota River near Peever, SD	242
Little Rock Creek near Rushmore	382
Little Rock River near Rushmore	382
Little Sioux River near Spafford	382
Little Stewart River near Two Harbors	372
Littlefork, Little Fork River at	138
Long Prairie River at Long Prairie	166
Long Prairie, Long Prairie River at	166
Lost River at Oklee	90
Lower Red Lake at Battle River mouth near Saum	80
Lower Red Lake near Red Lake	82
Luverne, Rock River at	368

M

Malung, Roseau River below South Fork near	114
Manitou Rapids, Rainy River at	140
Mankato, Minnesota River at	288
Maple River near Rapidan	379
Marsh River Ditch near Ada	374
Marsh River near Shelly	74
Marshall, Redwood River near	262
Maynard, Hawk Creek near	378
Middle Branch Rush River near Gaylord	379
Middle River at Argyle	104
Middle River near Newfolden	374
Milan, Chippewa River near	256
Mille Lacs Lake at Cove Bay near Onamia	208
Milliken Creek near Concord	380
Minneapolis, Shingle Creek at Queen Ave in	230
Minnesota River at Mankato	288
Minnesota River at Montevideo	258
Minnesota River at Ortonville	246
Minnesota River near Jordan	298
Mississippi River at Bemidji	375
Mississippi River at Brainerd	160
Mississippi River at Grand Rapids	152
Mississippi River at Prescott, WI	332
Mississippi River at Red Wing	346
Mississippi River at St. Cloud	186
Mississippi River at St. Paul	310
Mississippi River at Winona	358
Mississippi River below Lock and Dam 2, at Hastings	312
Mississippi River near Anoka	220
Mississippi River near Bemidji	144
Mississippi River near Fort Ripley	172
Mississippi River near Royalton	174

	page		page
Mississippi River at Aitkin	156	Pomme de Terre River near Elbow Lake	377
Montevideo, Minnesota River at	258	Prescott, WI, Mississippi River at	332
Montevideo, Spring Creek near	377	R	
Mora, Knife River near	324	Rabbit River near Nashua	373
Mud River near Grygla	374	Radiochemical program, definition of	9
Mustinka River above Wheaton	373	Rainy Lake near Fort Frances, Ontario	130
N		Rainy River at Manitou Rapids	140
Namakan River at outlet of Lac la Croix, Ontario	126	Ramsey Creek near Redwood Falls	378
Nashua, Rabbit River near	373	Rapidan, Blue Earth River near	272
National Atmospheric Deposition and Trends Network (NTN), def. of	7	Rapidan, Le Sueur River near	286
National Stream-Quality Accounting Network, definition of	7	Rapidan, Maple River near	379
National Water-Quality Assessment, definition of	8	Records of Ground-Water Levels	15
Nemadji River near Holyoke	373	Records of Ground-Water Quality	16
Nett Lake River near Nett Lake	136	Records of Surface-Water Quality	12
Nett Lake, Nett Lake River near	136	Records Stage and Water Discharge, definition of	9
Nett Lake, Wood Duck River near	134	Red Lake Falls, Clearwater River at	92
New Auburn, Buffalo Creek near	377	Red Lake River at Crookston	94
New Prague, Sand Creek near	379	Red Lake River at High Landing, near Goodridge	84
New Ulm, Cottonwood River near	266	Red Lake, Lower Red Lake near	82
Newfolden, Middle River near	374	Red River of the North at Drayton, ND	106
Nimrod, Cat River near	376	Red River of the North at Emerson, Manitoba	112
Nimrod, Crow Wing River at	164	Red River of the North at Fargo, ND	56
Nokasippi River near Fort Ripley	376	Red River of the North at Grand Forks, ND	96
North Branch Rapid River near Baudette	375	Red River of the North at Halstad	70
North Branch Whiteface River near Fairbanks	373	Red River of the North at Hickson, ND	52
North Fork Crow River above Paynesville	192	Red River of the North at Wahpeton, ND	48
North Fork Crow River at Paynesville	377	Red Wing, Mississippi River near	346
North Fork Crow River near Kingston	377	Redwood Falls, Ramsey Creek near	378
North Fork Yellow Bank River near Odessa	248	Redwood Falls, Redwood River near	264
Northfield, Cannon River at	379	Redwood River near Marshall	262
Numbering System for Wells and Miscellaneous Sites	9	Redwood River near Redwood Falls	264
O		Remer, Boy River near	375
Odessa, North Fork Yellow Bank River near	248	Rochester, South Fork Zumbro River at	354
Odessa, Yellow Bank River near	250	Rock River at Luverne	368
Oklee, Lost River at	90	Rockford, Crow River at	204
Onamia, Mille Lacs Lake at Cove Bay near	208	Root River at Rushford	380
On-site Measurement and Collection, surface-water quality	13	Root River near Houston	362
Ormsby, South Fork Watonwan River near	379	Root River near Lanesboro	380
Ortonville, Minnesota River at	246	Roseau River at Ross	116
Orwell Lake near Fergus Falls	38	Roseau River below South Fork near Malung	114
Other Records Available	12	Roseau River below State Ditch 51, near Caribou	118
Otter Tail River below Orwell Dam, near Fergus Falls	40	Ross, Roseau River at	116
Otter Tail River near Elizabeth	36	Royalton, Mississippi River near	174
Ottertail River near Foxhome	373	Royalton, Platte River at	376
P		Ruffy Brook near Gonvick	374
Palisade, Willow River near	375	Rum River near St. Francis	210
Park Rapids, Straight River near	162	Rush Creek near Rushford	380
Paynesville, North Fork Crow River above	192	Rushford, Root River at	380
Paynesville, North Fork Crow River at	377	Rushford, Rush Creek near	380
Peever, SD, Little Minnesota River near	242	Rushmore, Little Rock Creek near	382
Pierz, Hillman Creek near	376	Rushmore, Little Rock River at	382
Pigeon River at Middle Falls, near Grand Portage	28	S	
Pillager, Crow Wing River near	170	Sabin, South Branch Buffalo River at	62
Pine City, Snake River near	326	Sand Creek near New Prague	379
Pine River near Pine River	376	Sand Hill River at Climax	76
Pine River Reservoir at Cross Lake	158	Sandstone, Kettle River below	320
Pine River, Pine River near	376	Sandy Lake at Libby	154
Pipestone Creek near Pipestone	381	Sauk Centre, Ashley Creek near	376
Pipestone, Pipestone Creek near	381	Sauk River near St. Cloud	182
Platte River at Royalton	376	Sauk River tributary at Spring Hill	376
Plummer, Clearwater River at	88	Saum, Lower Red Lake at Battle River Mouth near	80
Pokegama Lake near Grand Rapids	150	Scanlon, St. Louis River at	32
Pomme de Terre River at Appleton	252	Sediment	13
		Shaw, Bug Creek at	373

page	page
Shelly, Marsh River near 74	Twelvemile Creek near Dumont 373
Shingle Creek at Queen Ave in Minneapolis 230	Twin Valley, Wild Rice River at 66
Silver Creek tributary near Two Harbors 372	Two Harbors, Knife River near 30
Sleepy Eye, Spring Creek near 378	Two Harbors, Little Stewart River near 372
Smith Creek near Hill City 375	Two Harbors, Silver Creek tributary near 372
Snake River near Pine City 326	U
South Branch Buffalo River at Sabin 62	Upper Red Lake at Waskish 78
South Branch Two Rivers at Lake Bronson 110	V
South Fork Root River near Houston 380	Valley Springs, S.D., Beaver Creek at 381
South Fork Watonwan River near Ormsby 379	Vermilion River near Crane Lake 128
South Fork Zumbro River at Rochester 354	Vermillion River near Empire 334
South Haven, Clearwater River near 377	W
Spafford, Little Sioux River near 382	Wahpeton, ND, Red River of the North at 48
Spring Creek above Downer 374	Walters, East Branch Blue Earth River near 378
Spring Creek near Montevideo 377	Warroad, Lake of the Woods at Springsteel Island near 142
Spring Creek near Sleepy Eye 378	Waskish, Upper Red Lake at 78
Spring Hill, Sauk River tributary 376	Water Temperature, surface water quality 13
Springfield, Cottonwood River 378	Watonwan River near Delft 378
St. Augusta, Johnson Creek near 377	Watonwan River near Garden City 270
St. Cloud, Mississippi River at 186	Welch, Cannon River at 342
St. Cloud, Sauk River near 182	Wheaton, Mustinka River above 373
St. Croix Falls, St. Croix River at 330	Whetstone River near Big Stone City, SD 244
St. Croix River at St. Croix Falls 330	Whiskey Creek at Barnesville 374
St. Francis, Rum River near 210	White Rock, SD, Bois de Sioux River near 42
St. Louis River at Scanlon 32	Whitewater River near Beaver 356
St. Louis River near Aurora 372	Wild Rice River at Hendrum 68
St. Paul, Mississippi River at 310	Wild Rice River at Twin Valley 66
Starbuck, Little Chippewa River near 377	Willow River below Palisade 375
Staright River near Park Rapids 162	Winnibigoshish Lake near Deer River 146
Station Identification Numbers, definition of 9	Winona, Mississippi River at 358
Statistics of monthly mean data 11	Winter Road River near Baudette 375
Stony Ruver near Babitt 374	Winton, Basswood River near 124
Straight River near Faribault 338	Winton, Kawishiwi River near 122
Sturgeon River near Chisholm 132	Wood Duck River near Nett Lake 134
Summary of Hydrologic Conditions 1	Y
T	Yellow Bank River near Odessa 250
Talmadge River at Duluth 372	Yellow Medicine River near Granite Falls 260
Thief River Falls, Thief River near 86	Z
Thief River near Thief River Falls 86	Zumbro Falls, Zumbro River at 380
Toimi, Cloquet River near 373	Zumbro River at Zumbro Falls 380
Trimont, Elm Creek near 378	
Tritium network, definition of 9	

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